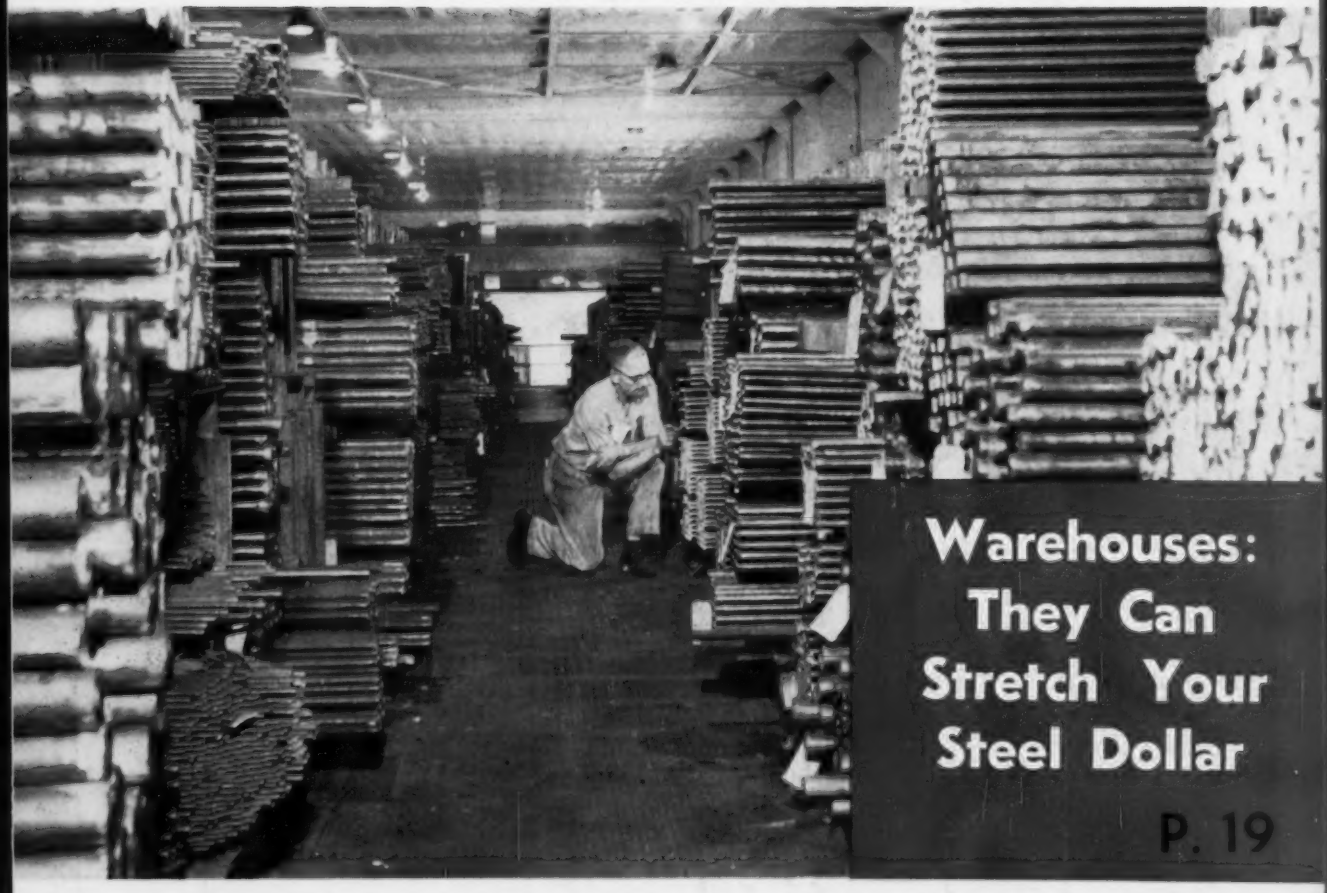
March 29, 1956

The IRON AGE

The National Metalworking Weekly

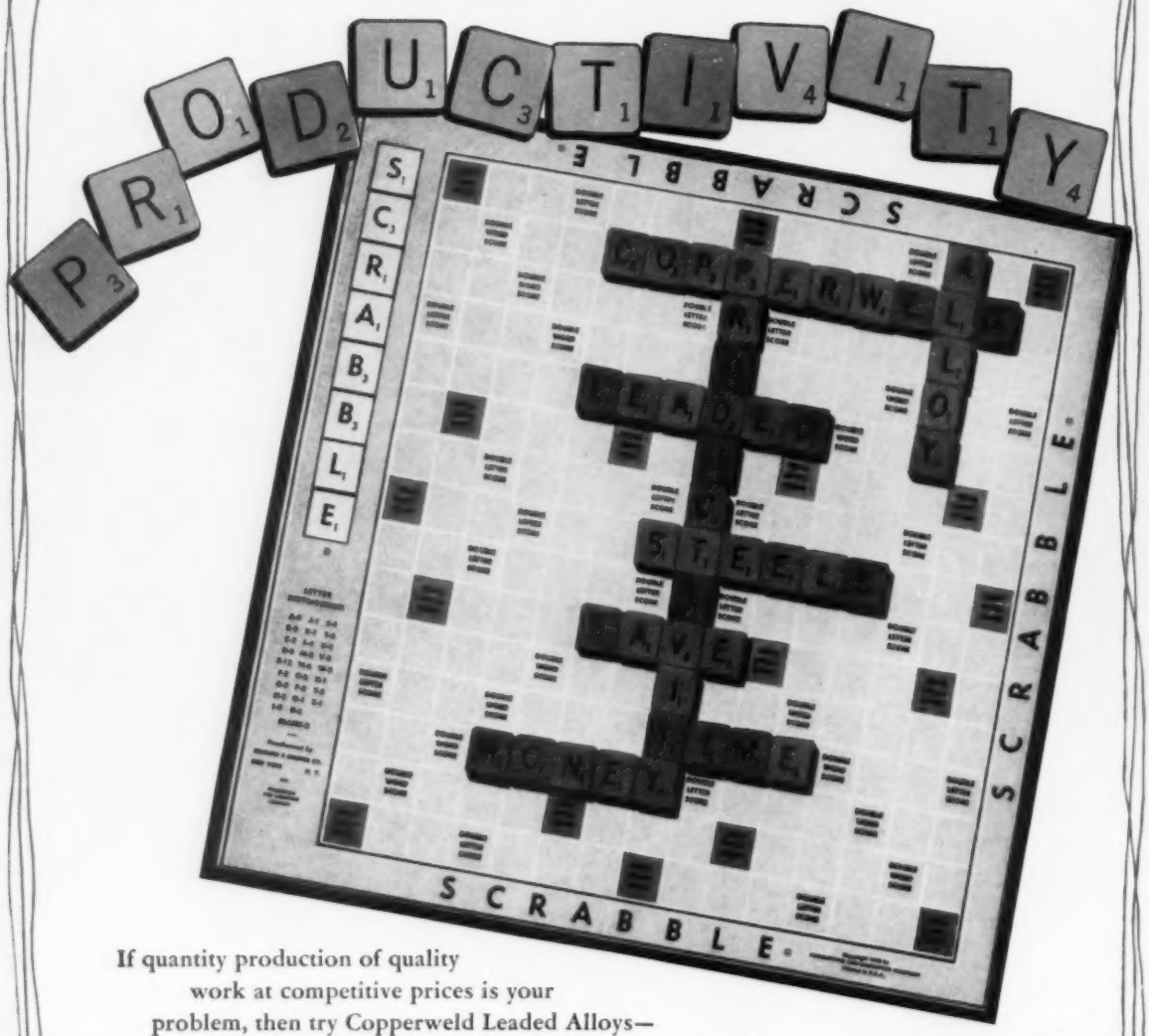


Warehouses: They Can Stretch Your Steel Dollar

P. 19

Tube-In-Strip: Bonanza For Fabricators P.59
Will Castings Be Tighter In Second Half? P.22
Digest of the Week P–2

the whole story is built around...



If quantity production of quality work at competitive prices is your problem, then try Copperweld Leaded Alloys—the steel with "built-in productivity." Copperweld Leaded Steels allow faster feeds and speeds, give longer tool life, and its finer finish often eliminates a finishing operation. Copperweld Leaded Steels can truly save you time and money.

Courtesy of Production and Marketing Company.

ARISTOLOY STEELS

For further details, write for free booklet, "Lead Treated Steels."

COPPERWELD STEEL COMPANY • STEEL DIVISION • WARREN, OHIO

EXPORT: Copperweld Steel International Co., 117 Liberty St., New York 6, N. Y.

Rowe Manufacturing Co., Whippany, N. J., use Bethlehem sheets to produce a wide variety of merchandise-dispensing machines.

"You pays your money and you takes your choice"

We Americans seemingly love to slip a coin into a slot. And the makers of coin-operated vending machines are doing a bang-up job of catering to this predilection. Today you can put your money in the slot and have your choice of anything from soft drinks and cigarettes to coffee, cakes and cleansing tissues.

The vending machine business got a sharp boost right after World War II and now it's really booming. Obviously sheet steel plays a big part in the manufacture of these units, and Bethlehem supplies a large share of sheets to makers of machines like those shown here.

The vending machine is but one of many sheet-steel applications that have claimed a larger and larger tonnage of Bethlehem sheets in recent years. Television cabinets, room air-conditioners, galvanized steel products, agricultural machinery — these and many other items have zoomed in popularity just of late.

Meanwhile the needs of longer-established sheet steel users continue right along. Which simply adds up to an unprecedented demand on Bethlehem's hot- and cold-rolled sheet facilities. We are trying earnestly to satisfy this demand.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM SHEETS

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

March 29, 1956—Vol. 177, No. 13

The IRON AGE

Digest of the Week in Metalworking

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Address mail to The IRON AGE
Chestnut and 56th Sts. Philadelphia 39, Pa.

NEWS DEVELOPMENTS

WHAT'S THE OUTLOOK FOR STEEL CASTINGS? P. 22

Now is the time to take a look at your steel castings inventory. While it's seldom wise to over-extend, higher prices are ahead and castings may actually get tight this spring. Steel castings for 1956 will hit 1.8 million tons against 1.5 in 1955.

MIDDLE EAST STRIFE MEANS TROUBLE IN OIL P. 26

Shooting war in Middle East means oil trouble to U. S. Our own stocks plus South America are adequate for own use only. Obligations to Free World would be difficult to carry out. It would mean rationing at minimum, probably higher prices.

WHY IRON ORE SHIPPERS RUSH SEASON P. 27

Ore carriers are ready for near record season. Steel boom and heavy blast furnace demand mean big demand for ore. Shippers expect to carry 95 million tons before freeze next fall.

THEY CAN'T SPEED UP AUTO TOOLING P. 36

You can discount most of what you hear about early introduction of 1957 cars. Sales of 1956's are picking up and there is no incentive to rush new models if the result is an even tougher cleanup problem. Besides, tool and die shops are loaded, can't take on more.

WHO'LL VOLUNTEER FOR OUTER SPACE? P. 41

Defense Dept. is talking seriously about dispatching a "moon" to outer space. It will act as observation post to locate targets for missiles. Each moon will be shot into space by a three-stage rocket. Department admits it will be harsh takeoff for crew.

CAREFUL and selective buying of steel from warehouses can save money for even big steel users. Properly balanced, warehouse steel combined with mill purchases can cut steel purchasing costs—See P. 19.

"M" DAY TOOL PROGRAM GETS GOING P. 47

If nation mobilizes for defense, three shift operations are guaranteed general-purpose machine tool builders. Office of Defense Mobilization set aside $21 million to back up program. Plan insures maximum production for first six months following declaration of "M" day.

FEATURE ARTICLES

TUBE-IN-STRIP: BONANZA FOR PRODUCT DESIGNERS P. 59

In coil form, it looks like an ordinary mill product. The difference: for the first time, hollow tubing and metal strip are combined in a single sheet of either copper, brass or aluminum. Attractively priced, the new mill product can be readily stamped or drawn to fit your application.

RADIOISOTOPES ARE READY FOR METALWORKERS P. 63

Hundreds of metalworking shops already are using radioisotopes widely. In addition to inspection, they now are employed for process control, for preventive maintenance, for product troubleshooting—for a host of other uses both on the production line and throughout the plant. If you haven't looked into radioisotopes, now is the time. It'll pay off fast.

WATCH THESE TRENDS IN PUNCH PRESS PURCHASING P. 66

There's a growing awareness among dieing machine users that these can be more than just moderately well-chosen hunks of cast iron, powered to do a particular job. Result is a modified buying approach, three emerging trends. These include a swing to heavier-than-needed units, more package purchasing, better-coordinated buyer-supplier engineering.

TITANIUM USE SPREADS WITH DEEP-DRAWN PARTS P. 68

Successful deep-drawing techniques point a way for chemical and food processing industries to benefit from the use of corrosion-resistant titanium equipment. For example, deep, seamless hemispheres are made into steam kettles for cooking food. Hot and cold forming techniques are described, together with production data and a set of recommendations for hot and cold forming.

NEW CONTROL MAKES PRESS OPERATION EASIER P. 72

Modern pressworking frequently calls for maximum flexibility in speed, but with a minimum of fussing. A newly introduced servo control system for hydraulic presses now gives fingertip control over six speed changes. Demonstrated on a 575-ton draw press.

MARKETS AND PRICES

WHAT'S NEW IN INDUSTRIAL DIAMONDS? P. 23

U. S. appetite for industrial diamonds continues to mount. Last year its 15 million carats consumed cost some $66 million. Economies of operating costs can offset higher initial cost of tooling. But special conditions are needed.

WEIR RUFFLES STEEL'S CALM WATERS P. 24

Industry's lone wolf, Mr. Weir, now challenges U. S. Steel's price policy. He infers prices must be raised now, if steel is to be able to finance needed expansion. It's not the first time Mr. Weir has taken the bull by the horns when conditions warranted.

CONSUMER COURSES WILL TEACH 'EM TO BUY P. 28

More manufacturers are plunking their money on the barrelhead for customer training courses. They are discovering that instruction programs pay off in terms of prestige and improved competitive position. Consumers are all for them because proper procedure helps cut operating costs.

WHY SAN DIEGO INDUSTRY MUSHROOMS P. 45

Aircraft manufacture is bread and butter for this expanding Southern California city. Population is up 43 pct since 1950, may reach million by 1960. Big Four in city's aircraft are Convair, Rohr Aircraft, Ryan and Solar. Expansion is coming.

STEEL DEMAND CONTINUES TO MOVE UPWARD P. 107

Steel demand is picking up in the face of seasonal upturn and renewed uncertainty over labor outlook. The "soft" spots in certain products seem to be more technical than actual.

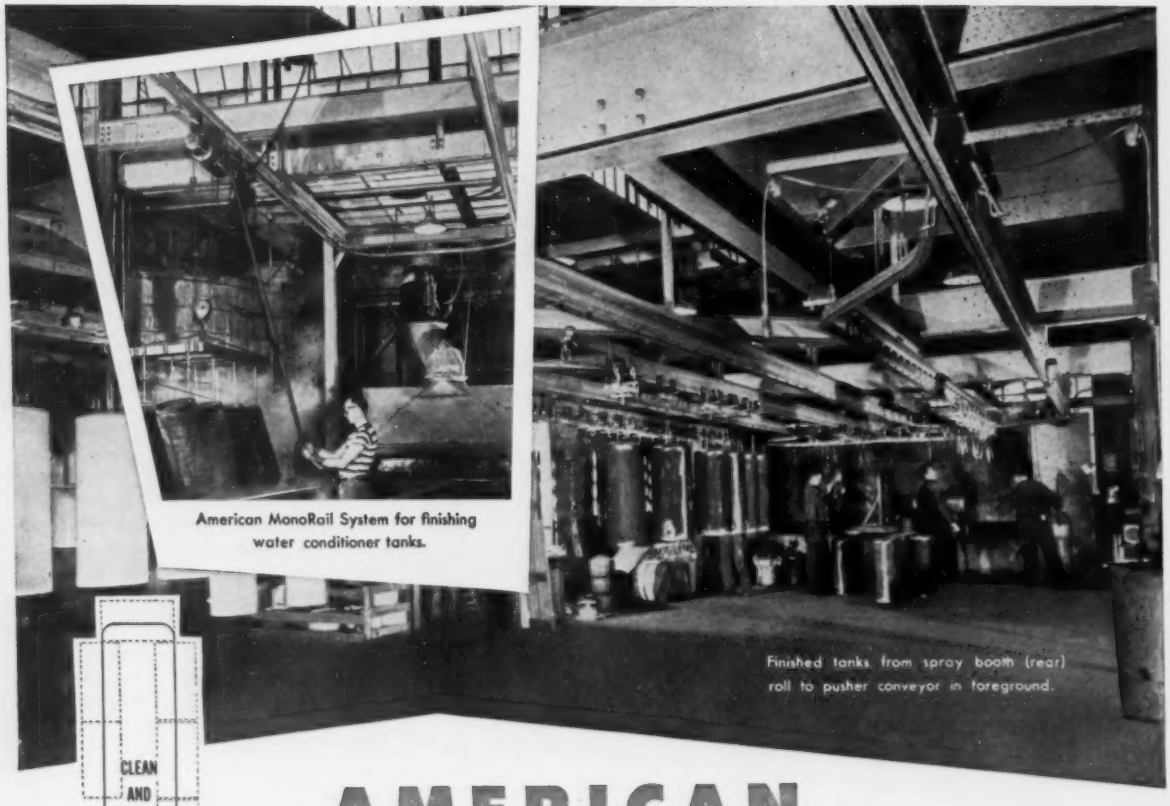
NEXT WEEK:

INDUSTRY DISCOVERS OHIO RIVER VALLEY

Ohio River Valley of song and fable is blossoming into a real industrial frontier. Atomic energy, steel, chemicals, ferroalloys, appliances, automotive, and other industries are flocking into the Valley wholesale. An IRON AGE analysis, telling the story of this new industrial growth.

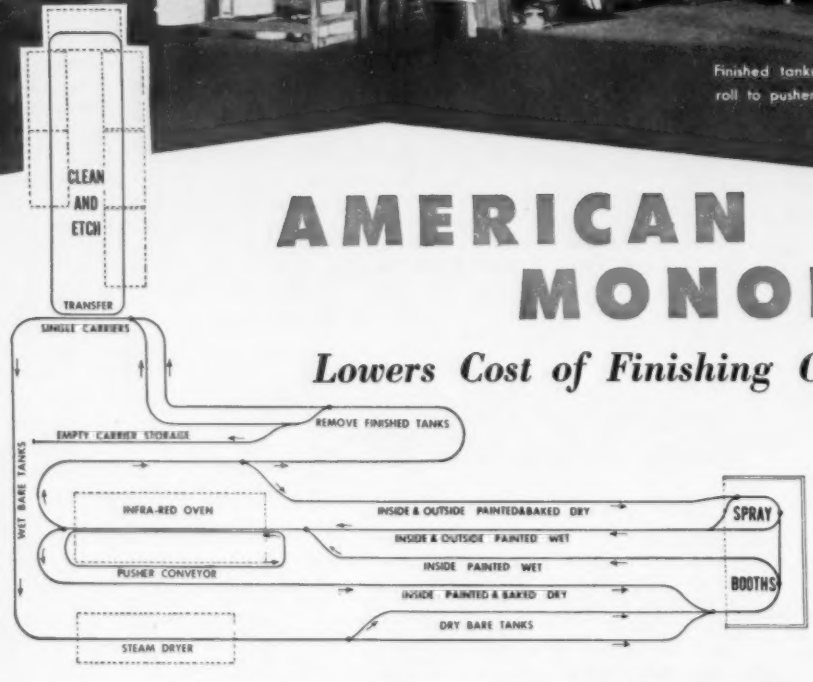
SPEEDY SHELL MOLDING SAVES MACHINING TIME

Shell molding a brand new steel provides an improved product at lower costs. In addition to design advantages, machining time is profitably cropped. Tool life is increased. Viewed from the shop standpoint, shell molding's meteoric growth isn't accidental. It's based on solid engineering.



American MonoRail System for finishing water conditioner tanks.

Finished tanks from spray booth (rear) roll to pusher conveyor in foreground.



AMERICAN MONORAIL

Lowers Cost of Finishing Operation

Costs are cut every step from cleaning and etching to finished tanks in this continuous operation by American MonoRail. For this manufacturer the up-and-over system of materials handling boosted production, improved space utilization, cut damages to material and improved both working conditions and production control.

If you have a materials handling problem, call your nearby American MonoRail engineer. He is qualified to help you solve it.

up and over

"Up-and-Over" is the title of our 16-mm. sound film to solve many tough handling problems at low cost. Please allow three weeks to schedule showing.

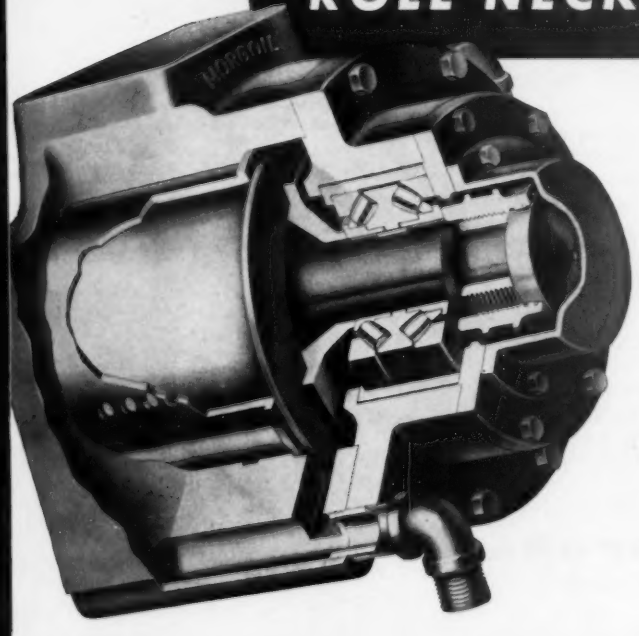
AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13103 ATHENS AVENUE • CLEVELAND 7, OHIO

Member of Materials Handling Institute - MonoRail Association

MORGOIL
ROLL NECK BEARINGS



These 26″-90 MORGOIL Bearings are operating in a 10½″ & 30″ x 30″ single stand four high reversing cold mill at Lombarde Falck in Milan, Italy. Hot mills or cold mills, ferrous or nonferrous, at home or abroad, MORGOILS give the best roll neck bearing performance at the lowest cost.

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WORCESTER, MASSACHUSETTS

ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS
WIRE MILLS EJECTORS REGENERATIVE FURNACE CONTROL

English Rep., International Construction Co., 56 Kingsway, London W. C. 2, Eng.

MB-36

MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER

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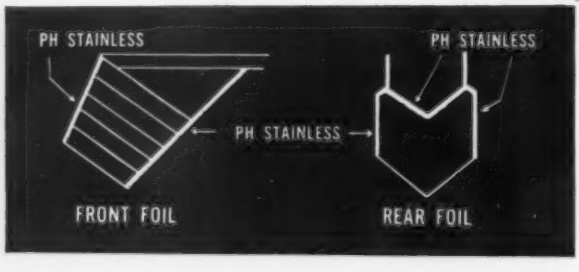
SPECIAL ARMCO STAINLESS STEEL

Helps Navy Sailboat "FLY"



Skimming over the water is easy for the Navy's Monitor because its hydrofoils act like wings. As the boat picks up speed, water moving past the foils creates lift (like air passing an aircraft wing). Soon the hull is lifted above the water and the craft is free of the "hull drag barrier" which previously limited sailing speeds.

◀ Armco precipitation-hardening stainless steel bars were profile-milled to form side support struts of the large front foils, sides and upper "V" of the rear foil.

Sturdy support struts made of special Armco precipitation-hardening stainless steel bars frame the three hydrofoils of the Navy's Monitor—a "flying sailboat." These struts must be extra strong, for when the boat is "flying," all loads are carried through the stainless steel struts to the water.

Extremely high strength of Armco PH Stainless Steel bar helps the Monitor "fly" because it permits use of a thin section, reducing drag and keeping weight at a minimum. What's more, struts made of this special precipitation-hardening stainless steel offer good corrosion resistance.

Two Grades—The two Armco precipitation-hardening stainless grades, 17-7 PH and 17-4 PH, have solved product-problems for many manufacturers. They offer an unexcelled combination: Good forming and welding qualities in the annealed condition; after fabricating, high strength and hardness with low-temperature heat treatments.

Armco 17-7 PH is produced in sheets, strip, plates, bars and wire. Armco 17-4 PH is supplied in bars and wire.

For full information on these special stainless grades, call the nearest Armco Sales Office or fill in and mail the coupon.

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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

EDITORIAL

WOC's Are Harder To Come By!

◆ THE BEST WAY to get a man not to help you is to insult him where it hurts the most. Infer that if he isn't a crook, he would be if he had the chance. Or another way to get him to crawl off into a corner and tell you to do it yourself is to imply that he hates his country—or likes himself better.

That's about the way Congress is handling the WOC's (businessmen in government without compensation). Most politicians will tell you privately that it is all in good clean election-day fun. But we wonder what would happen if Congressmen had to take the hot seat. They hardly ever do, you know.

Businessmen to help out in defense and in complex government matters are harder to come by each month. When present WOC's get home they will have no charming story to tell. It is theoretically true that for patriotism a man should be willing to take all the mud that's thrown. But that's the rub—there's too much.

After all, why should successful industrialists go down to Washington and be probed, inferentially accused, insulted, and told that they are tools of "big business"? They don't have to. And what's more, that's the way a lot of honest, forthright business people think these days.

The fellows who go to Washington and put in long hours trying to help out in defense problems are ordinary human beings. They don't like this "do you still beat your wife" stuff any more than the next person. Some have stronger constitutions and more money than others. But the majority of those called to Washington to work for their country are not well-heeled. They give up plenty to do this.

Congressmen are playing with fire when they condone prying and searching parties. The provision that businessmen who become WOC's should have their private financial matters aired for all to see, snicker at, and accuse is ridiculous.

If a man wanted to be crooked—or serve special interests—no amount of questioning, probing and rooting would deter him. Why sully all men called to Washington because Congressmen want some light banter for their election bag of tricks.

You just can't hardly get WOC's no more!

Tom Campbell

EDITOR-IN-CHIEF

ATLAS CHAIN GIVES A LIFT TO MATERIALS HANDLING

SHERMAN FORK LIFT USES ATLAS CHAIN FOR DEPENDABLE LOAD CARRYING STABILITY

On the Sherman Fork Lift, produced by K-D Manufacturing Co., Cleburne, Texas, you'll find the stamina and strength of Atlas Chain proving its ability to operate smoothly under all loads. These fork lifts are equipped with 5/8 pitch Atlas Chain. Two chains are run over pulleys, each carrying a load of 2,000 pounds . . . the capacity of the lift being 4,000 pounds.

Wherever power must be transmitted or products conveyed you'll find an Atlas Chain and precision-matched sprocket built to give longer service under all operating conditions. Atlas Chain is scientifically pre-tested sixteen times for accuracy, tensile strength, durability and smooth, quiet performance. Atlas is constantly conducting torture tests on all types of chain to bring you finer and better chains for your particular application. Next time contact your local Atlas distributor and specify Atlas Roller Chain . . . or write Atlas Chain & Manufacturing Company, West Pittston, Pa. You'll be better off for a long run.

ATLAS

ROLLER CHAIN AND SPROCKETS

dear editor:

letters from readers

Plant Dispersal

Sir:

In view of the scarcity of the copies of the January 19 issue of your magazine, we would like to have your permission to reprint the article, "Dispersal: Where's the Incentive?" and distribute it to FCDA officials and state and local Civil Defense Directors for their information. Each complete page would be reproduced as it appeared in the magazine and would include credit to THE IRON AGE.

If we can be of help in furnishing other information for articles of this nature I hope you will feel free to call on us. *V. L. Couch, Director, Industry Office, Federal Civil Defense Administration, Battle Creek, Mich.*

Heating Units

Sir:

The March 8, 1956, issue of IRON AGE carried on page 117 an article titled, "Heating Units — What's the Trend." The survey as covered by the article was necessarily nationwide. Could you supply me with similar material for the Cleveland area? We are, of course, interested in just how this area compares with the rest of the country. *B. M. Lyons, Industrial Sales Department, The Cleveland Electric Illuminating Co., Cleveland, Ohio.*

Oliver Johnson, Director of Research, will send more information on Cleveland area companies.—Ed.

Wants Explanation

Sir:

In your issue of March 8, 1956, page 141, last column on right hand side—5th line above picture is the word "clecos," also in third line above the picture.

All dictionaries and library facilities that I have access to, fail to list or explain this word.

Can you provide a definition or illustration of its meaning. *C. W. Cyphers, Tanner Road, Elnora, N. Y.*

A cleco is small spring-type clamp used in aircraft manufacturing to hold two pieces of sheet metal together for riveting or bolting. Patent owner is Monogram Mfg. Co., Div. of International Glass, Culver City, Calif.—Ed.

Management Team

Sir:

I certainly enjoyed reading your March 15 article "How to Keep Your Operating Team In Trim." Operating management people can work effectively only if their duties are clearly defined and they have the freedom to perform them in the most efficient manner. But tell me, who are the gentlemen on the cover? *F. Johnson, Bridgeport, Conn.*

Left to right: H. E. Miller, Budget Director; E. L. Burkhart, Manager of Personnel and Community Relations; R. Whitehurst, Vice President and General Manager, and M. McMullan, Jr., Comptroller of Exide Industrial Div., Electric Storage Battery Co., Philadelphia.—Ed.

Tooling $

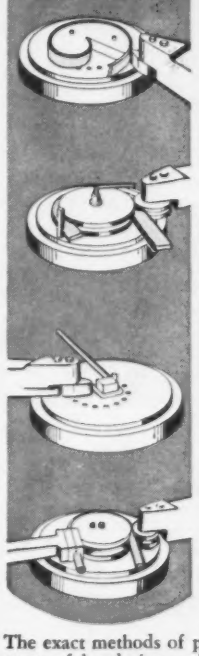
Sir:

Would you kindly send us three copies of your excellent article entitled "How to Get More for Your Tooling Dollar" which appeared in the March 8, 1956, issue of THE IRON AGE? *D. B. Roach, Battelle Memorial Institute, Columbus, Ohio.*

"it's easy to bend"

a new 32 Page BENDING MANUAL

by the originators of "Die-less Duplicating"



This instructive and authoritative booklet will quickly prove itself indispensable wherever bending is done or is needed. It brings you a veritable gold mine of tested authentic bending methods applicable to any rotary type bender. The proper bending technique may frequently offer a new approach to an old problem by simplifying product design and cutting production costs.

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G.T.M. More than doubles life of tin line rolls

ABOUT 18 MONTHS was considered excellent service for the rubber covered rolls in the plating compartments of this tin line. Abrasion and cutting plus constant immersion in approximately 200° F. sodium stannate solution were the life-limiting factors.

Then rolls specified by the G.T.M.—Goodyear Technical Man—were put to the test. They served an average of 3 years and 7 months—were worn down only 1/16" in turning out 4,000,000 base boxes or 71,000 miles of tin plate. And with regrinding they'll be ready for many miles more!

The G.T.M. may well have a similar answer to your rubber covered roll or other industrial rubber problems. Why not find out by contacting him through your Goodyear Distributor? Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

RUBBER COVERED ROLLS by

GOODYEAR

THE GREATEST NAME IN RUBBER

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

fatigue cracks

by William M. Coffey

Letters

Following is a letter from what we would enthusiastically classify as a real, living doll. Advertisers, particularly, pay close attention.

Dear Mr. Coffey:

Re your opening statement in your column February 16 (*wherein we made reference to the volume of advertising that IA carries—ed*), it may interest you to know that I eagerly look forward to each issue. I find the ads very interesting and educational. In my position as private secretary to an extremely busy Plant Superintendent (check your files, he is a subscriber), this particular female takes the liberty to scan each issue of IRON AGE, carefully noting items relative to our type of manufacture, in order to enable him to enjoy them at his leisure. In fact, if his hectic schedule does not permit even a small "peek" into his latest copy, the IA often finds itself well established in his home library.

. . . your ads are cleverly and attractively planned. A patient boss and our Chief Clerk who, incidentally, has a splendid background (supervisory) in the field of metal refining—both ferrous and nonferrous — have played major roles in my quest for knowledge of production data. They patiently answer all my queries. In fact, when a new production setup is initiated the Superintendent conducts a personal tour explaining the various phases of operating and their consequent outcome. This pays off as I compose all his correspondence. He often follows up an explanation by flipping through the IA looking for an ad to illustrate the point in question. The wonderful aspect of your ads is that they not only star the product but they are also illustrated "in action" (machine ads).

ARE YOU STILL WITH ME? (*wouldn't miss a word—ed*) Sorry, I didn't mean to shout — hope you found a comfortable chair . . . chapter two coming up! Please forgive the informal tone of this letter but I feel I know you through your column and I'll bet you're quite a humorist yourself! (*Ha!—ed*)

IA articles about the "A" bomb and related subjects held my interest. More of the same please . . . (my boss feels he knows a deadlier weapon . . . ME!) Oh, I'll just bet there are ornerier secretaries!

The section devoted to automotive production is always welcomed. Surprise my husband many times about the latest innovations on the future models . . . he asks the source and always gets the same answer, "THE IRON AGE, of course!"

Above all, I never miss the wonderful editorials — very thought provoking—by Tom Campbell and blank blank by that master of blank blank (*we naturally omit any flattering remarks as they tend to sabotage our "mission" to get quit of this column—ed—the only sour note in an otherwise remarkable letter*). Cover to cover it is indeed a fine publication!

Now that I've unloaded my little (?) sermon on the merits of your favorite printed matter, please excuse me so I can get my nose back in position . . . between the covers of the Feb. 16th issue of IRON AGE!

Most sincerely yours,
Rusty (Mrs. R. K.) *O.M.S.
*Chapter member of the Order of Mischevious Secretaries.

Note — We have withheld Mrs. Robert Krawczyk's name and the name of her company, General American Transportation Company, because we really do not know if Mrs. Krawczyk would want us to print the letter or not. Rusty, if you ever need a job just drop around to Chestnut & 56th Sts., Philadelphia. Call us collect—Sherwood 8-2000.

If your sawing costs are mounting because you're not getting consistent low-cost operation, maximum production, and minimum downtime, call your Victor Distributor. He's the man who can bring your costs down to eye level. Once he's listened to your troubles, he'll recommend the *right* Victor Hand and Power Hacksaws, Metal and Wood Cutting Band Saws, and Hacksaw Frames for all your needs.

Your Victor Distributor will especially want to tell you about Victor "Moly"® High Speed steel blades. He'll tell you that "Moly" blades can save you real money because they outlast standard steel blades 10 to 1, cut as well as the *best* high speed steel blades made, and yet are substantially lower in cost!

And be sure to ask your Victor Distributor for a supply of our NEW Metal Cutting Booklets and Wall Charts. They're packed full of interesting information.

Sold Only Through Recognized Distributors

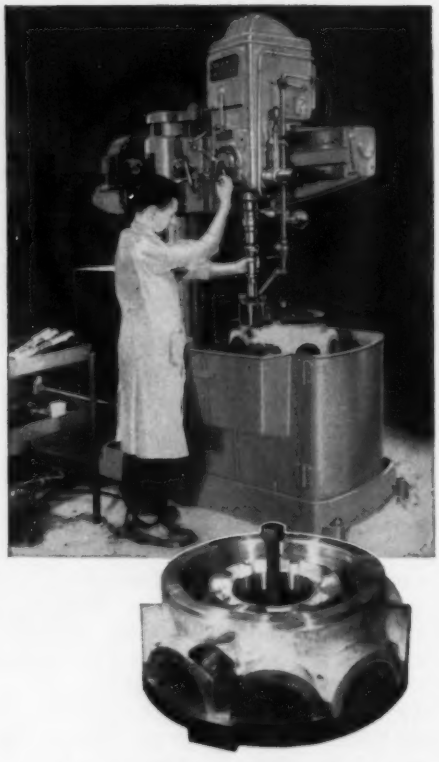
1950

VICTOR

SAW WORKS, INC., MIDDLETOWN, N.Y., U.S.A.
MAKERS OF HAND AND POWER HACKSAW BLADES, FRAMES, AND METAL AND WOOD CUTTING BAND SAW BLADES

Cincinnati Bickford MEETS ALL REQUIREMENTS AT Canadian Pratt & Whitney Aircraft Company LIMITED

Drilling, Core Drilling and Reaming Alloy Steel Cheek and Counterweights of Aircraft Engine Crankshafts. Reamed holes are held accurate within .0005". Second machine is boring and facing Inlet and Exhaust Ports on Cast Aluminum Cylinder Heads.



Drilling, Counterboring, Reaming and Tapping 1¾" Hole in Aluminum Crankcase Forging Section to a tolerance of ±.001".

Six Cincinnati Bickford 9" column Super Service Radial Drills have given a fine performance and established a record for accuracy and reliability, and have met production problems at Canadian Pratt & Whitney Aircraft Co., Ltd. Modern Cincinnati Bickford features for convenient easy handling, power and speed have made these machines highly profitable. Investigate these money makers.

Write for Bulletin R 21C.

Photos courtesy of Canadian Pratt & Whitney Aircraft Co., Ltd., Montreal, Canada.

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION

Cincinnati 9, Ohio, U.S.A.

GIDDINGS & LEWIS MACHINE TOOL CO. : Fond Du Lac, Wisconsin

dates to remember

APRIL

MATERIALS HANDLING INSTITUTE—Spring meeting, April 3, Edgewater Beach Hotel, Chicago. Society headquarters, 813 Clark Bldg., Pittsburgh.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.—Annual spring engineering conference, April 4-6, Lehigh University, Bethlehem, Pa. Society headquarters, 101 Park Ave., New York.

AMERICAN SOCIETY OF LUBRICATION ENGINEERS — Annual meeting and lubrication exhibit, April 4-6, William Penn Hotel, Pittsburgh. Society headquarters, 84 E. Randolph St., Chicago.

EXPOSITIONS

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW—Oct. 8-12, Cleveland.

NATIONAL SCREW MACHINE PRODUCTS ASSN.—Annual business meeting, April 4-7, Hotel Schroeder, Milwaukee. Society headquarters, 1010 Euclid Bldg., Cleveland.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS —Annual conference, April 9-11, Netherland Plaza Hotel, Cincinnati, O. Society headquarters, 29 W. 39th St., New York.

METAL POWDER ASSN. — 12th annual meeting, April 10-12, Cleveland Hotel, Cleveland. Society headquarters, 420 Lexington Ave., New York.

NATIONAL ASSN. OF ARCHITECTURAL METAL MANUFACTURERS —Annual convention, April 12-17, Belleview-Biltmore Hotel, Belleair, Fla. Society headquarters, 7209 Cedar Ave., Washington, D. C.

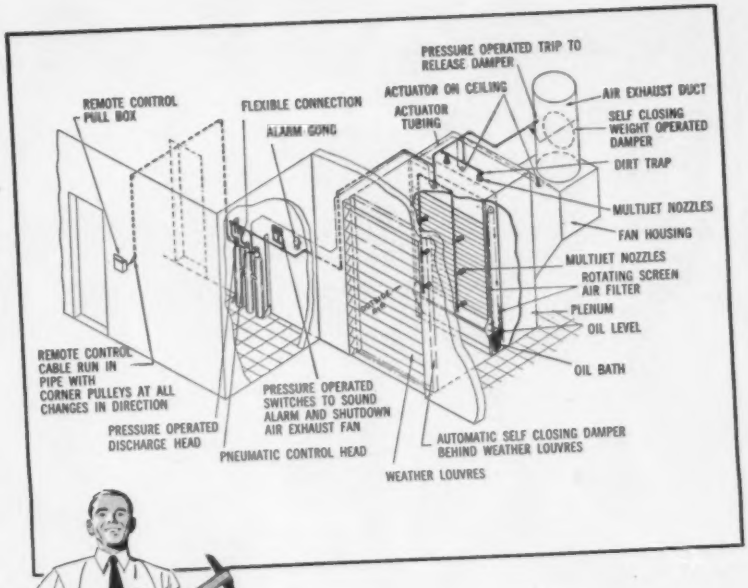
SHEET METAL CONTRACTORS ASSN. —Convention, April 16-17, Abraham Lincoln Hotel, Springfield, Ill. Society headquarters, 1928 Fullerton Ave., Chicago.

AMERICAN ZINC INSTITUTE—38th annual meeting, April 23-24, Hotel Statler, St. Louis, Mo. Society headquarters, 60 E. 42nd St., New York City.

MAY

NON-FERROUS FOUNDERS' SOCIETY —Annual meeting, May 3, Marlborough-Blenheim, Atlantic City, N. J. Society headquarters, 192 N. Clark St., Chicago.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS —1956 Pacific Northwest regional conference, May 3-5, Olympic Hotel, Seattle. Society headquarters, 29 W. 39th St., New York.



Guard oil bath air filters with Kidde engineered fire protection!

LOOK HERE — a fire hazard that could easily turn a building to a heap of cinders — *completely* protected by a tailor-made Kidde CO_2 Fire Extinguishing System! Kidde engineers haven't missed a trick!

At the first sign of fire, rate-of-temperature-rise detectors trigger the system, pressure-operated switches simultaneously close dampers, shut down fans and sound an alarm while fire-killing clouds of CO_2 stop the blaze in its tracks. What protection!

And what features Kidde systems have! Using safe, efficient CO_2, they leave no mess to damage equipment, nothing to clean up after a fire. And their special rate-of-temperature-rise detectors insure *complete* protection 24 hours a day. Kidde systems need no attendance, day *or* night!

Kidde systems have no falling weights, use no clumsy mechanical triggering methods. Pneumatic or Electrical Control Heads insure instant and complete CO_2 discharge. All moving parts of a Kidde system are self-enclosed for safety, need no replacement after a fire, have easy-to-read indicators which show at a glance whether system is "set" or "released." What's more, special Directional Valves let you guard more than one hazard from the same cylinder bank, giving you the most *versatile* protection on the market today!

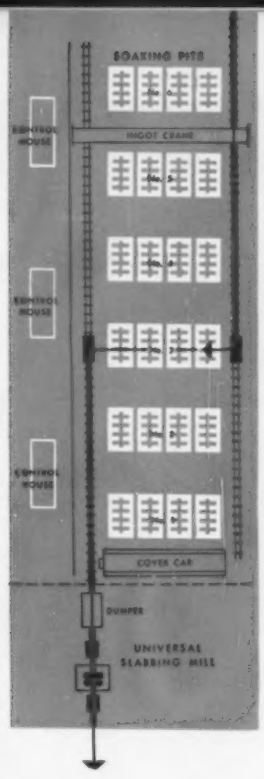
It's easy to get the *best* in fire protection. For information about *your* specific problems, write Kidde today.

Kidde

Walter Kidde & Company, Inc.
350 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada, Ltd., Montreal—Toronto

The words 'Kidde', 'Lux', 'Lux-O-Matic', 'Fyre-Freez' and the Kidde seal are trademarks of Walter Kidde & Company, Inc.

at Great Lakes, too...



high-production soaking pits

. . . a convincing example of 'Surface' leadership. Behind the story of these 24 soaking pits at Great Lakes Steel, Detroit Division of National Steel Corporation, is an imposing record of achievement: Surface Combustion has built 80% of all new pits since World War II.

At Great Lakes, six batteries, four 'Surface' pits in each, heat low carbon steel ingots for automotive and appliance steel. They also heat some low alloy steel ("NAX" grade). Capacity will be still further increased by the addition of 16 new 'Surface' pits now being built.

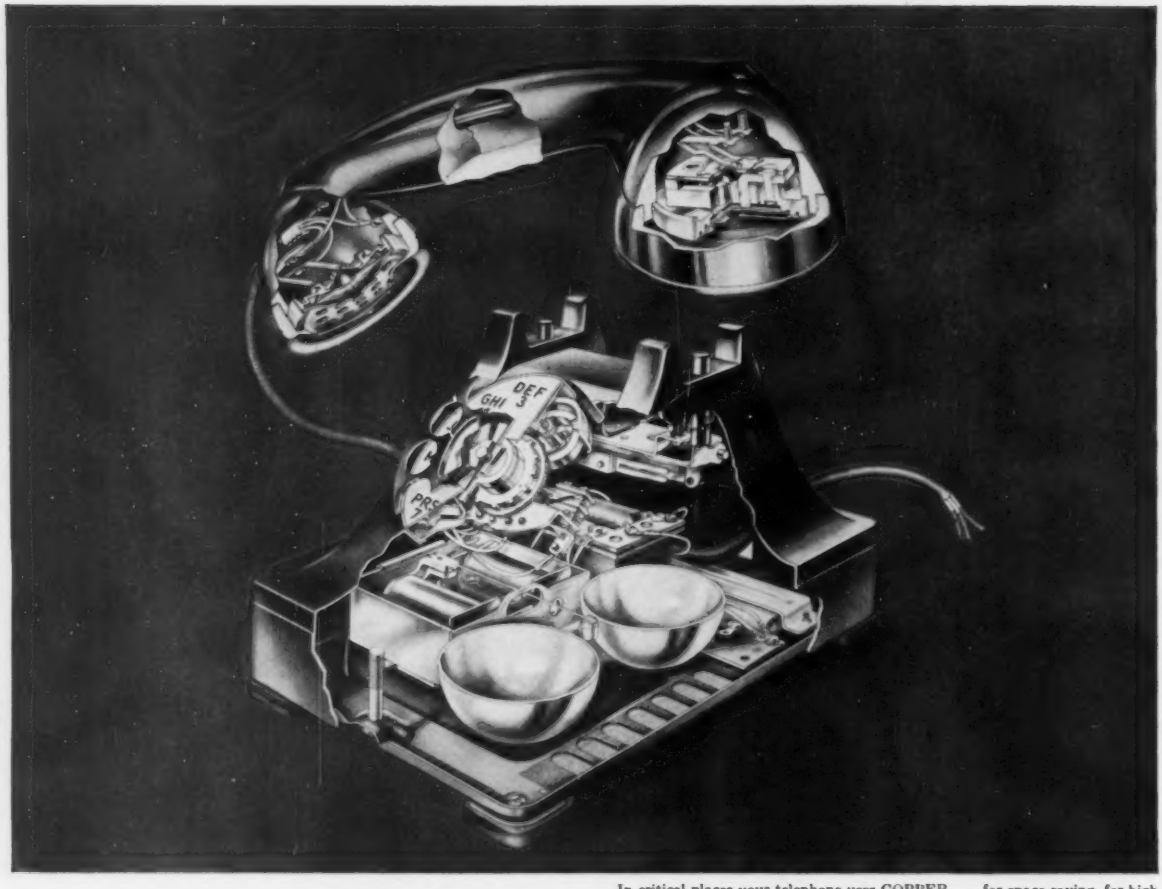
These one-way-fired pits include such 'Surface' features as the efficient jet pump recuperative system, and integrated temperature and combustion controls which are of the most modern design. The performance of these pits, and many others, is among the reasons why steelmakers depend on 'Surface.'

SURFACE COMBUSTION CORPORATION, TOLEDO, OHIO

Surface
STEEL MILL FURNACES

Foreign affiliate companies:

British Furnaces, Ltd., Chesterfield; Stein & Atkinson, Ltd., London
Stein & Roubaix, Paris, Liege, and Genoa; Chugai Ro Kogyo Kaisha, Ltd., Osaka
Benno Schilde Maschinenbau, A.G., Bad Hersfeld (Hessen, Germany)



In critical places your telephone uses COPPER . . . for space-saving, for high electrical conductivity and ease of joining, for dependable performance.

COPPER
speaks for itself!

Everyone who uses copper learns something from it . . . something no substitute can teach.

To the man who machines or stamps or draws metals, copper and its alloys speak of easy workability.

To the firm that uses copper parts instead of substitutes, copper tells the story of satisfaction . . . of standing up in service.

To the designer of complicated equipment, copper offers savings in valuable space . . . permits "miniaturization".

And to the home-owner wise enough to install copper throughout his "castle", time itself tells an unending tale of trouble-free enjoyment.

Copper will speak for your product, too. It will signify *quality!*

It costs you less to make your product well, before it is sold . . . than to make it good, afterwards.

COPPER & BRASS
RESEARCH ASSOCIATION

420 Lexington Avenue, New York 17, N. Y.

. . . AN INDUSTRY SOURCE OF TECHNOLOGICAL AID, INCLUDING A LIBRARY OF TECHNICAL LITERATURE AND A COUNCIL OF SPECIALISTS

COPPER OR ITS ALLOYS PROVIDE THESE ADVANTAGES:

Best conductor of electricity commercially available

Does not rust . . . high corrosion resistance

Best heat transfer agent of all commercial metals

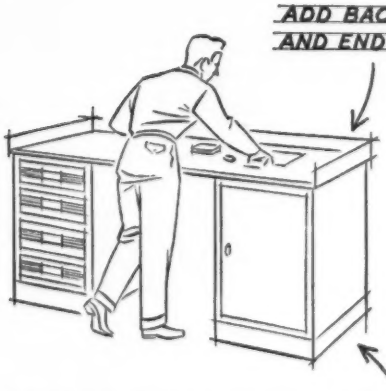
Easy to machine, form, draw, stamp, polish, plate, etc.

Welds readily . . . excellent for soldering and brazing

HOW TO USE STANDARD HALLOWELL UNIT WORK BENCHES AND ACCESSORIES IN PLANT MODERNIZATION

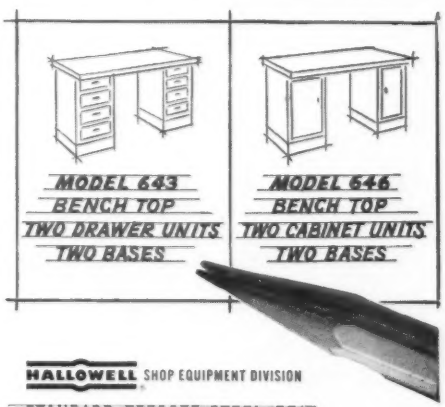
MODEL 640 - BENCH TOP, DRAWER UNIT, CABINET UNIT, TWO BASES

ASSEMBLE THEM IN CONTINUOUS LINE - JOINED IN THE MIDDLE OF THE UNITS OR BUTTED END-TO-END



USE THEM AS INDIVIDUAL BENCHES

4 TOP MATERIALS, 2 LENGTHS, 2 WIDTHS
2 HEIGHTS - ALL STANDARD



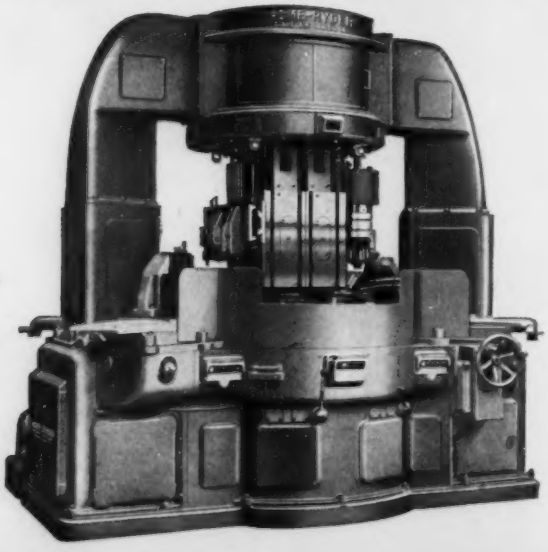
Standard Units · Standard Accessories · Sturdy Steel Construction · Stocked by Leading Shop Equipment Dealers · Send for "Benchery" - a Humorous Booklet on What You Can Do with Hallowell Benches · Hallowell Shop Equipment Division, Standard Pressed Steel Co., Jenkintown 17, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION
STANDARD PRESSED STEEL CO.
SPS
JENKINTOWN PENNSYLVANIA

BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING

14" ACME

8-SPINDLE VERTICAL HYDRAULIC



OFFERS MORE

of what you need in a Vertical Chucker

- ★ Sturdy arch frame and massive base construction provides rigid support for top housing and vertical toolslide column.
- ★ Four independently-operated cross slides.
- ★ Feed control of all toolslides by positive cam control.
- ★ Eight vertical toolslides for end-working tools and attachments.
- ★ Wide range of feeds and spindle speeds, with 3-speed selectivity at each work station.
- ★ Operating controls conveniently located at front and rear of machine.

THE NATIONAL ACME COMPANY

170 EAST 131ST STREET • CLEVELAND 8, OHIO

RYDER

CHUCKING AUTOMATIC

Introduced by

NATIONAL ACME

also built in 6-spindle, 17-inch capacity

in response to today's **NEED** *for* **SPEED**

JUNIOR'S SOLO WINS AT POLO

(control does the trick)

CHIEF KEOKUK:
"Where polo ball? How me hit ball when no see 'um?"
CHIEF KEOKUK JR.
"This Injun version of 'hidden ball trick.' Control of ball wins chukker!"
PRINCESS WENATCHEE:
"Junior's goal is control —and that always pays off!"

Control pays off . . . in polo or processing iron and steel! Many leading foundries and steel plants control costs and quality with Keokuk Silvery Pig Iron . . . the superior form of silicon introduction. Pig for pig, car for car, its uniformity never varies. Handle it by magnet . . . charge it by weight (or count the piglets for equal accuracy). Leading aluminum producers specify Keokuk Silicon Metal for uniform high purity.

When you think of SILICON think of KEOKUK!

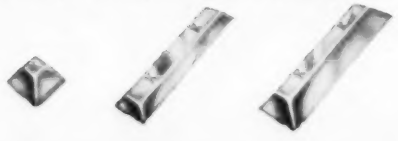
KEOKUK ELECTRO-METALS COMPANY KEOKUK, IOWA

Wenatchee Division, Wenatchee, Washington

SALES AGENT: MILLER AND COMPANY

332 S. Michigan Avenue, Chicago 4, Illinois
3504 Carew Tower, Cincinnati 2, Ohio
8230 Forsyth Blvd., St. Louis 24, Missouri

Keokuk Silvery Pig Iron is available in 60 and 30 pound pigs and 12½ pound piglets . . . in regular analysis or alloyed with other elements to match your requirements.



S.S. United States . . . most modern, fastest liner afloat.

Nothing finer!

A statement from
a conservative organization:

"Our records show that when a manufacturer once discovers the uniform quality of Roebling flat spring steel, he becomes a steady Roebling customer."

You, too, *pay* for the best spring steel . . . make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK

What about steel supply?

All the talk about record steel demand these days may obscure the fact that six principal types of steel products are currently in good supply at Ryerson—only three may present a procurement problem.

Sheet and strip stocks—substantially improved, especially cold rolled and galvanized stocks. We now have a good tonnage of sheet steel in almost all types, gauges and sizes.

Alloy bar stocks—no supply problem here. Call us for any type including carburizing and direct hardening alloys, heat treated alloys, leaded alloys, etc.

Stainless steel stocks—large and diversified, including large tonnages of both nickel-bearing and straight-chrome types of time-tested Allegheny stainless steel. But please give us D. O. ratings for nickel-bearing types if you have them. You will be helping to assure future availability of these types as nickel supply tightens.

Tubing inventories—excellent. Mechanical tubing, fluid power tubing, structural and boiler tubing stocks are all as complete as they have ever been.

Cold finished bar stocks—also at a high point in tonnage, in range of sizes and in diversity of types. Included: machinery steel, shafting, accuracy stock, Ledloy, many others.

Reinforcing steels—on hand to meet most any construction requirement.

Plates and structurals—still present the toughest procurement problem. However, it will pay you to check with us. Though all sizes are not always in stock at any one time, we are handling substantial tonnage of these products and will be glad to make a note of your requirements and call you if the item you need becomes available.

Hot rolled carbon bar inventories—considerably better than plates and structurals, but heavy demand sometimes makes it difficult to meet every size requirement. Still, we do have the nation's largest stocks of this commodity including many tons of many types.

Whatever your steel requirements, you can be sure of these facts when you draw on Ryerson stocks: Quality of product will be completely dependable. Service will be quick and accurate—and your orders, as always, very much appreciated.

RYERSON CERTIFIED STEELS

JOSEPH T. RYERSON & SON, INC.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI
CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

NEWSFRONT

Asbestos-Coated Color Panels

Latest wrinkle in the colored-construction-materials field is asbestos-protected steel. Metal panels, asbestos-faced, are being offered in a variety of colors for roofing and siding applications. First sizeable installation saw red panels used in a Texas building.

Molybdenum, Titanium Are Teamed

Molybdenum, an established alloying element in steelmaking, is moving into titanium. Called a "best possible" addition, it is creating a brand new family of titanium alloys with improved ductility, greater toughness, high uniform elongation. Since some of these properties are especially important during cold-working, the new alloys could help ease critical titanium fabricating problems.

Assault On Scale Planned

Interior Dept. asks Congress to pony up $200,000 for a fresh research assault on scale. Department scientists feel scale produced on metal by salt-water contact is principal block to use of new fresh water distillation processes. Whipping it is key to problem of low-cost distillation of fresh water from salt water.

Where's The Stainless Going?

Better statistics on stainless steel consumption are in the offing. AISI's Committee on Stainless Steel and American Steel Warehouse Assn., have undertaken the project jointly. Warehouse sales account for a large share of stainless market. Until now, no systematic breakdown of these sales by market classification has been attempted.

Aluminum Arc-Cutting Accepted

First actual production application of the recently-announced process for arc-cutting aluminum fully supports the claims. Cutting rates to 300 ipm in ¼-in. stock are being realized in the manufacture of low-pressure aluminum vessels. Company's engineers report 54S aluminum cuts like butter.

Headache For Utilities

Air conditioners have greatly upped summertime power consumption; have power companies concerned over what to do with generating capacity left idle in winter months. Unbalance grows greater with fast growth of air-conditioning. Utilities answer: push heat pumps, electric space heating and similar devices to step up wintertime electric consumption.

Decimates Die-Making Costs

Steel rule dies are finding broader application. Costing less than 10 pct what standard tool steel blanking dies cost, the improved tools now shear stainless and alloy steels in thicknesses to ¼-in. Production runs of more than 100,000 parts per die have been achieved. Die-making costs, using the steel-cutting-edge, plywood-backed dies, are reported cut 95 pct by one firm.

New "Hot Materials" Handbook

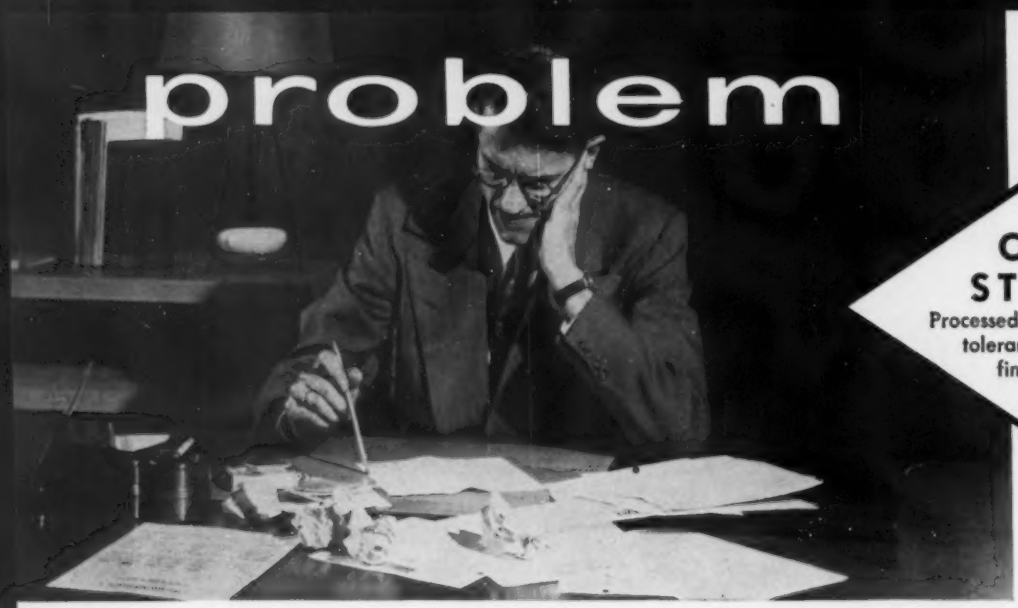
Coming soon: a new safety practices handbook on handling radioactive materials, now widely used in industrial welding, foundry work. Reason: a reduction in allowable radiation exposure levels. AEC has already settled a number of radiation damage suits out of court.

Research In Atomic Fuels

Putting cash behind its belief that many motor trucks will be atom-fueled by 1965, a major trailer manufacturer is joining a newly-formed. $50-million atomic power company. Eighteen of 26 member companies are power companies; rest represent electrical, electronics, metalworking, engineering firms. Groups object: research and development in use of nuclear fuels.

Better Brazing Material Due

New lithium brazing alloys, recently in the news as a promising self-fluxing brazing material, are expected to be commercially available by mid-year. Lithium's strong deoxiding nature promotes wetability. Using a silver alloy of 1 pct lithium content, stainless has been consistently brazed in air without flux.



CMP
RESTRICTED SPECIFICATION
COLD ROLLED STRIP STEEL
Processed to meet special gauge tolerances and provide special finishes and physical properties . . . solves many fabrication, cost & performance problems.

Helping to overcome metal fabricating difficulties, improving products without skyrocketing costs or just getting costs down are usual events with **CMP.**

For example, the manufacturer who was heat-treating formed steel parts subsequently assembled with other components into a powered unit. The forming involves severe deformation and was hampered by lack of uniformity in the annealed strip steel. Distortion in the heat treatment followed, resulting in a low percentage of finished assemblies passed as satisfactory.

To minimize these fabricating difficulties, **CMP** developed a special annealing process for the strip. Using this steel, parts, when subjected to the manufacturer's standard heat-treating practice, were acceptable and yield was greatly increased.

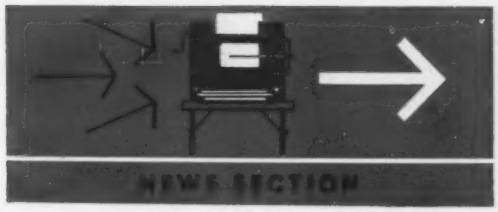
At **CMP,** processing cold rolled strip steel to restricted specifications has been reduced to an exact science and **CMP** men have been trained to spot opportunities for solution of production cost and product improvement problems through application of restricted specifications.

Why not put your problems up to a **CMP** man?

C M P

THE COLD METAL PRODUCTS CO.
GENERAL OFFICES: YOUNGSTOWN 1, OHIO
PLANTS: YOUNGSTOWN, OHIO AND INDIANAPOLIS, IND.
SALES OFFICES: NEW YORK CLEVELAND DETROIT INDIANAPOLIS CHICAGO LOS ANGELES SAN FRANCISCO

CMP
RESTRICTED SPECIFICATION
COLD ROLLED STRIP STEEL
is available in
Low Carbon Grades • High Carbon Spring Steel (annealed and tempered) • Stainless Types • Alloy Grades • Electro Zinc Coated



Warehouse Buying Economical

Mill buying not always the cheapest . . . Inventory maintenance can be 20 pct of purchase price . . . Just where mill buying pays is debatable—*By K. W. Bennett.*

◆ WAREHOUSE STEEL, augmenting mill purchasing, was an inestimable boon to many a buyer in 1955. There's reason to believe, however, that many buyers forget the economies of warehouse buying when mill steel is readily available.

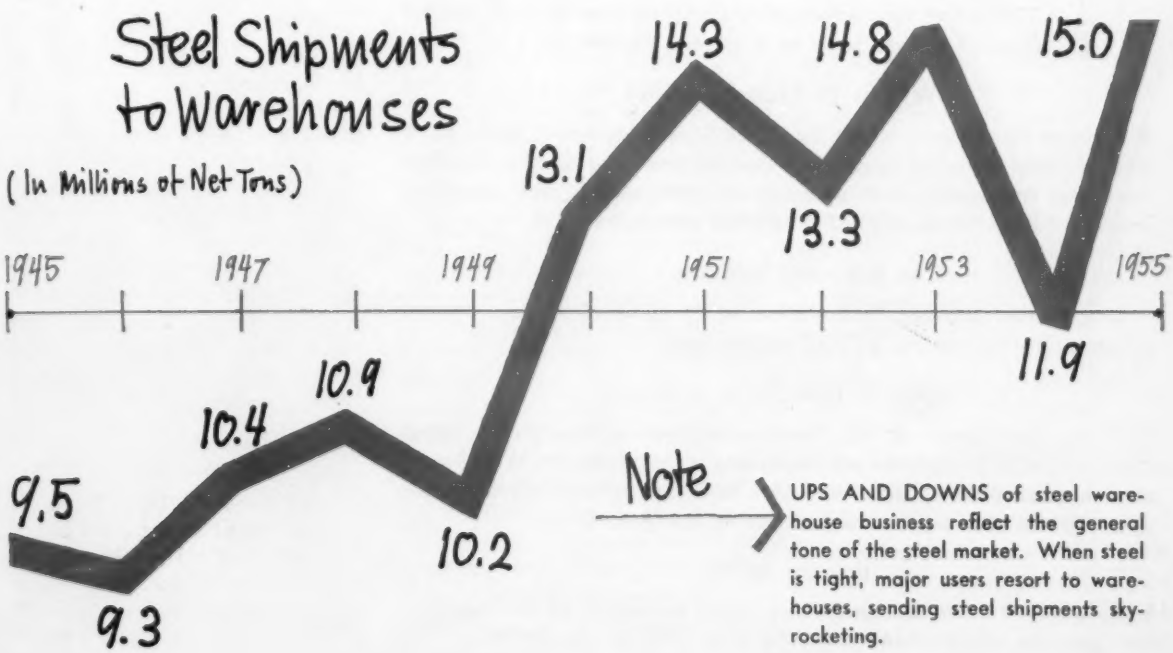
Properly balanced, warehouse buying of steel can be combined with mill purchases to cut costs in percentages that even some veteran steel buyers find difficult to believe. Warehouse buying, properly considered, can mean more than steel in the bank. It can mean operating dollars there as well.

Reduction in inventory costs is a prime point. In the bulk, mill steel is cheaper. But if he's buying in minimum mill lots, the steel buyer must consider the cost of storing steel until time of use.

Storage Costs High

Trundle Engineering Co., Cleveland, has studied steel storage costs over a period of years. Its findings indicate that the traditional "6 pct o f purchase price" as a rule of thumb for figuring inventory storage costs is dead as the parlor crystal radio. The Trundle studies indicate a total average of 16.5 pct per year. The breakdown of averages: Interest, 3.5; taxes and insurance, 1.0; housing cost, 2.0; handling and records, 4.5 pct; spoilage and pilfering, 1.5; obsolescence, 4.0.

The Trundle survey has been carefully rechecked over a period of years, with about 17 pct as the average storage cost per year remaining fairly steady. Other sources feel that the 2.0 pct housing cost is a conservative figure, though Trundle has been careful to point out that its figure is an average, with extremes in either direction.



UPS AND DOWNS of steel warehouse business reflect the general tone of the steel market. When steel is tight, major users resort to warehouses, sending steel shipments skyrocketing.

SPECIAL REPORT

A second recent study allows 2 pct per month increments (except the first 30 days) as an inventory cost. One steel buyer has evolved a rigid formula in which rate of use of the steel purchased is figured against the tonnage bought. If purchase of a minimum lot of mill steel would require long storage and high storage costs, the order is broken into a series of monthly warehouse orders.

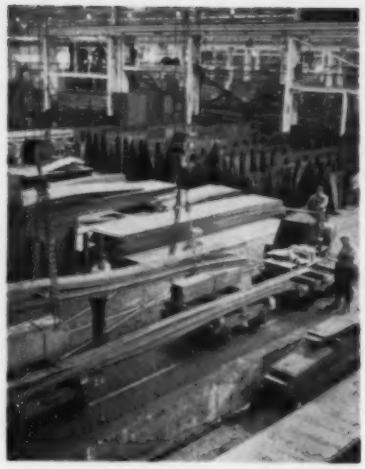
Where's the Line?

A number of purchasing men with the same thought in mind, use a Mark Purchasing Lot Size Calculator, a kind of circular slide rule which figures what the inventory will cost over the required period of inplant storage. Other firms are beginning to find that 22 pct per year, and even 24 pct should be alloted to costs for inplant storage of inventory.

When a steel purchase order is in the "twilight zone" of 10,000 to 15,000 lb, many firms automatically label it a mill purchase. This attitude has been changing.

One firm has augmented its original steel buying staff of one with a second steel buyer. Buyer number one purchases mill steel. The second buys steel from warehouse. The point is this: The second buyer is a specialist in saving buying dollars through economic purchase of warehouse steel. The old 10,000 lb limit on warehouse orders is now ignored. If an order falls in the 10,000 to 20,000 lb range (though the 20,000 lb top is unusually high) the warehouse steel buyer and the mill buyer work out the potential economies on both sides before deciding where to buy. This despite the fact that the average order is about 1000-1200 lb in total warehouse order receipts.

It's this expanding "twilight zone" that purchasing agents are studying closely in an effort to determine whether to buy from mill or from warehouse. For instance,



comparison of mill quantity extras with a warehouse quantity discount for a combination order may cut the difference between the two base prices by as much as $38.

Other Factors

That 17-22 pct cost of storage in inventory is the first factor governing their decision. At least five more factors must be considered.

Probably second in order of importance is scrap loss. One buyer had purchased sheared plate for years for cutting to circles. He now purchases flamecut circular blanks from a nearby warehouse. With a $20 credit per ton on the scrap, with the freight savings, and with reduction in maintenance of his own implant cutting equipment, he's making money on the transaction.

Another, who had been forging a part, now buys a similar product, again flamecut, from a local warehouse. Again, by carefully considering the actual cost of his raw material costs and his fabricating work, he's upped his profit on the part. The same move has been made on flamecut farm equipment parts and on flamecut gear blanks in particular. Even warehouses reportedly suffer a 6 pct scrap loss on plate.

Watch Obsolescence

Point three for the buyer figuring the cost of steel orders in the "twilight zone": Will the reduced base cost of a minimum mill order justify the amount of material he'll carry in stock, when it's pos-

Steel Warehousing Footnotes:

How It Began

▪ Back in 1765 when Sam Adams was enrolling Liberty Boys, a New York businessman opened shop as a metals warehouse.

Where It Stands Today

▪ At least 30 members of the American Steel Warehouse Assn., have passed their first 100 years in blooming health. And the industry continues to expand, with upwards of 2000 warehouses supplying industrial steel to an estimated 500,000 customers.

Business Volume

▪ Warehouses provide 31.8 million sq ft of steel storage space, housing a metal reserve of 3-3.5 million tons.

What It Can Do In A Pinch

▪ In the steel pinch of '55, the reserve was a lifesaver to many firms with high production schedules and low inventories. Warehouse reserves last year dropped almost 1 million tons—a modest indication of total warehouse business during the period.

Volume In '55

▪ More than 15 million tons of steel were marketed by the industry last year, in lots averaging slightly over 1000 lb per order.

sible that model changes in his end product will make portions of the inventory obsolete? With the accelerating design changes of the past 10 years, this is a risk to consider.

Automotive has made model changes annually for a number of years, and farm equipment, appliances, the electrical and electronics industries, and other major producers of both consumer and industrial goods are tearing up the blueprints almost yearly and starting afresh.

Two years ago one purchasing agent had about two years' supplies of castings in his plant yard when caught by a sudden downturn in the production rate. Today he buys on a rigid 60-day schedule that cuts back at the first storm warning.

Resale of automotive inventory raw materials that would be of doubtful value after a model change is increasingly common. And much of it is repurchased by warehouses for resale. The quality is excellent but size specifications have changed. The warehouse is in an admirable position to rework the material for a new customer's requirements.

Avoid Premiums

Point four, and one of increasing importance: A historical pattern of buying at a warehouse is an admirable adjunct to a historical buying pattern with local mills. Since the end of World War II, steel shortages have come with almost clocklike regularity, despite vast increases in mill capacity.

Cuts steel inventory costs ← estimated at 20 pct of purchase price.

→ Reduces scrap loss.

Eliminates some primary manufacturing. ←

→ Avoids obsolete inventory.

Prevents paying premium prices. ←

→ Conserves factory space.

Eliminates cost of some equipment.

→ Cuts handling costs.

Last year is the most recent case in point. Many buyers who'd been caught in the shortages of late 1952 and early 1953, augmented their incoming steel with warehouse buying. When things went soft in 1954, the warehouse was dropped almost entirely from the regular buying schedule. Came 1955, and again steel went short.

The mills were obliged to put customers on a quota system which was often based on the 1954 buying pattern. By mid-1955, warehouses were having to do the same thing, and the unique situation occurred where customers were asking their warehouse steel sources to set up "order books" for regular monthly deliveries as in steel mill practice.

Just as the mills were forced to reduce shipments to customers who didn't normally trade with them, so the warehouses honored the requests of long-term customers. Assuming that a buyer will always buy steel where he can at the least cost to his company, nonetheless this is one of the factors that many are beginning to weigh before signing the final purchase order.

The alternative is buying from premium priced "in-and-outers," or buying conversion or foreign steel. All three exceed warehouse steel in cost.

At least one buyer is figuring the tonnages of premium steel he's purchased over a 10-year period, and will use the data to establish an annual minimum rate of warehouse buying from an established warehouse supplier. He'll continue to buy from warehouse those minimum orders most economic when bought at warehouse rather than mill. But he'll see that he has an established minimum annual tonnage from this source. In one case, this runs to a high 20 pct of total purchases, though this is certainly not a generally useful figure.

Space Expensive

Of more interest to plant management than the steel buyer himself, are points five and six. If maintaining a 60-day inventory based entirely on mill purchasing is to be done, how much will the

necessary space cost in terms of heating, maintenance and materials handling equipment to move the inventory?

A few plant chiefs with even sharper pencils are working out and charging to this space the difference if the same area, or at least part of it, were used for productive capacity.

No one is charging off bull mad for inventory reduction at all costs, but increased attention is going to the amount of space that will allow optimum working inventory of mill steel augmented by warehouse steel.

One firm plowed through the inventory area and expanded plant work space by 25 pct. This, in a 150-man operation which normally wouldn't be expected to have a large steel inventory, or at least not large enough to carry that much dead wood. Another began to review the situation after a passing observer commented that he'd seen one piece of equipment and one work crew spend a morning looking through an outside inventory stock for one piece of plate.

Equipment Costs

Again, of perhaps slightly more interest to the plant manager than the steel buyer: The warehouse operates a major battery of equipment that is used for the customer's steel requirements and is available on a jobbing basis for other steel work.

Joseph T. Ryerson & Sons, for instance, operates an upcut line delivering 100 tons of flattened coil, cut to customer sheet specifications, per day.

One thing is clear. There are no inviolable tenets for steel buying. Each new steel order is a law unto itself. And it's equally true that more information on the art and science of steel buying is badly needed.

Research has been done by Alcoa, Westinghouse, and General Electric, as well as Trundle Engineering. But more material is needed. It's pretty positive that the American Steel Warehouse Assn. will tackle the cost accounting of handling materials in inventory, a report of vital interest.

PRODUCTION

CASTINGS: Take a New Look

Threatened cutbacks never materialized . . . Backlogs lengthen . . . Prices are sure to go up . . . Steel and gray iron foundries work at capacity . . . No letup seen.

◆ HOW'S YOUR castings inventory?

Granting that it's never good policy to overload a manufacturing inventory, a number of buyers are realigning their sights—watching to see that their inventories of foundry casings don't get too low. It's a switch from the past 30-60 days when a number of cutbacks from customers chewed away backlogs.

The reasons are two: (1) a price rise is bound to come. Steel prices will go up and foundry scrap of all grades already has, from cast to electric furnace. Foundrymen have held the price line pretty well, but there is a limit to the amount of stretch that can be absorbed before their own prices to the castings consumers begin to inch up. (2) Foundry business, despite much talk of declines in the automotive and farm equipment industries, is strong. At least a handful of gray iron foundrymen are finding their March orders will exceed the February level and February was a good month.

Sales Are Up

The situation is most quickly spotted in steel castings. Electric furnace operators are turning down offers for ingot to be used for conversion. Some have been sold, it's true, but more offers to buy have been turned down. At the moment, steel foundrymen are betting that castings tonnages this year will hit 1.8 million tons. The total ship-

Shipments of Steel Castings

ments for 1955 are estimated at 1.5 million tons.

Industry speakers talk of a 20 pct advance in total steel castings shipments this year, but it's a fact that some firms in the industry are running as much as 35 pct over year ago levels this month. More important, it's figured that currently bookings are exceeding shipments by 25 pct, and that steel castings backlogs average about four months. It's the 14th month that orders booked have exceeded shipments. Backlogs among some producers of stainless castings are out as far as nine months.

Full Speed Ahead

As of last week the industry was reported operating at 80 pct of maximum commercial demand. In the steel industry this would be figured as about 100 pct of capacity operations. You can produce more but it means considerable straining.

The picture is not without soft spots. Railroad demand for castings, for instance, has been highlighted by holdback orders in recent weeks that have chewed at steel castings backlogs. But these are holdbacks, not order cancellations. Carbuilders still have their orders placed, need the castings, but must adjust their incoming castings rate to the amount of structural and steel plate available. This steel has been increasing but has still resulted in some slack in immediate carbuilder demand for steel castings.

Backlogs Up

What about gray iron, tonnage-wise a substantially larger portion of the total castings picture. (14,838,000 tons gray iron castings shipped in 1955 as compared with 1,500,000 tons of steel castings.) Gray iron founders were reported at 95 pct of capacity earlier this year and the Gray Iron Founders' Assn. last week estimated shipments at 95 pct of capacity (on a 1951 capacity base). It's a total of 15,000,000 tons of castings in 1956, the industry's best year to date.

Backlogs range up to four weeks in an industry that traditionally has low backlogs. These have been chewed back slightly, but not to the extent that some alarmists would believe. Indicative is the fact that pig iron producers are booked solidly through first half.

PRODUCTION

DIAMONDS: Still on Upswing

Tool engineers are learning more about industrial diamond uses . . . But it's no field for amateurs . . . Applications are specialized . . . Smart use pays good dividends.

◆ U. S. APPETITE for industrial diamonds continues to grow. In 1953, the world produced 16,400,000 carats of industrial diamonds, and of these, 12,765,495 were imported by the U. S. Last year the figure was over 15,000,000 carats worth $66,000,000. The Industrial Diamond Assn. now numbers 65 members.

Industrial diamonds can't and won't replace carbide and high-speed tools in industry, but the diamond tool, working in tandem with other cutting materials or in its own special applications, is on the way up.

The American Society of Tool Engineers at Chicago pinpointed the role of the diamond tool last week. The general conclusions: Metalworkers are learning to use diamond tools and like the results. Economies in operating costs can offset the higher initial cost of such tooling.

But: The diamond tool must be designed for the job in which it's to be used; it can't be used in overage equipment where vibration could wreck the diamond; the stone must be positioned correctly in the tool; tool mountings must be absolutely rigid with minimum rake and clearance.

Cost Figures

Added to these don'ts, initial cost of the diamond tools seems alarmingly high. In one instance, a $1.15 carbide tool was replaced on a machining job with a $45 diamond tool, and the diamond tool cost 10 times as much to resharpen as the original item. Savings came in tool life. The diamond stood up to 50,000 workpieces on a cranky job that knocked out the particular carbide tool after 2500 pieces.

Some of the specialized jobs in which diamond tooling has proven economic include precision (.001 in.) machining of a hard rubber part full of highly abrasive filler materials; machining of a close tolerance plastic bushing; machining of cemented carbide, cutting of an asbestos plexiglass combination, even turning of a small silver part in high production lots to 8 micro-in., in a satin finish. Besides, there are the workhorse tasks of tool sharpening and grinding wheel lapping with either single-point or multipoint diamond tools, with diamond wheels, or with the newer cemented diamond particle tools.

The high production output and high finish requirements of today's manufacturing have boosted industrial diamond usage. At the Plymouth V-8 engine plant at Detroit, camshafts are ground, both rough and finished, on an automatic line. Grinding wheels load quickly in cast-iron grinding, so the aluminum oxide grinding wheels are automatically dressed after each cam grinding cycle. Manual wheel dressing, which would slow the line, is eliminated.

Another version of automatic wheel dressing is already marketed in a Jones & Lamson Model E form grinder. The unit employs a dressing wheel; diamond particles of plus 20 to minus 200 mesh embedded in a powdered metal matrix that can be shaped to the desired wheel form. Minute diamond particles (Cemented Diamond Particles, or CDP) have been used in a shaped block with a grinding wheel to cut V notches in very hard steel for Charpy impact testing.

Alone or in combination with other tools, diamonds can be strong medicine for failing production lines.

PRICING

WEIR: The Lone Wolf Does it Again

E. T. Weir critical of U. S. Steel timidity on question of higher steel prices . . . Says industry needs more income now in order to pay for necessary expansion . . . Break in industry front—By *Tom Campbell.*

STIRRING up a tempest in steel is nothing new for National Steel's E. T. Weir. His indirect criticism of U. S. Steel's pricing policies is typical of Mr. Weir's penchant for speaking his piece and letting the chips fall where they may. Issues are cash prices, and expansion.

◆ DON'T LOOK now but the quiet decorum that has pervaded the steel industry for a few years has become ruffled. Those people who look toward Washington aren't going to like the way things are going. But the lusty and basic steel industry has always busted out of its pants from time to time. And it has done some good.

The big inside hassle now involves cash, expansion and prices. (see IRON AGE March 22, '56 p. 38). Even Dave McDonald, Steelworker's chief, has gotten into the act as a result of an economic lecture which appeared in the United States Steel Corp.'s financial report for 1955. But that's a side issue to the big show.

The big story is that the industry's lone wolf, Ernest Tener Weir, earthy board chairman of National Steel, has broken the silence barrier on steel industry etiquette. Some of the youngsters in high places in steel might be shocked but oldsters are seeing things repeated.

Others may talk about expansion. Others may make a plea for higher prices. Others may timidly state that we are short of steel. But when Mr. Weir finally let's loose with his ideas, there is no mistaking whom he is talking about and what he means.

The Challenge

In a nutshell, "E.T." is hot around the collar about the kicking around the industry has been given. He thinks that the customer is right when he gets rough about the repetitive steel shortages. He thinks the steel industry needs cash and quickly. He infers that steel prices must be raised now. And he indirectly—but everyone knows what he means — challenges the position that U. S. Steel has taken in its price policy.

Back in the late 30's, Mr. Weir felt so strong about some steel industry policies that he broke a precedent of long standing by refusing to seek re-election as president of the American Iron and Steel Institute. That was no overnight decision on his part. He made it after a lot of soul searching. That is why his blast before the New York Society of Security Analysts last week might be a time bomb.

For many years Mr. Weir—who once granted a ten cent an hour increase in the midst of the U. S. Steel's labor negotiations—has been content to be what is usually called an elder statesman. At least that's what people thought. They were wrong. His size-up of what the steel industry requires, what is needed to get it, and what has to be done is the best summation to date when compared with other studies.

Solid Front Broken

As usual he goes the industry surveys and suggestions on expansion one better. He believes that right today the capacity of the industry should be six million tons more than its current 128 million tons. And he thinks that an additional 12.5 million tons must be built quickly in the next five years—a total of 18.5 million tons of capacity.

He answers the big burning question on borrowing (Again see IRON AGE, Mar. 22, '56, p. 38) by admitting that in years to come his company could borrow $400 million but would have to take the additional $250 million needed for its expansion, from earnings. This, he argues, can't be done at today's prices. That's because an all-new steel plant, which Mr. Weir figures his company will have to build one of these days, must be at least of 2 million ton capacity at a cost of $650 million.

What's behind all this come-to-the-surface turmoil in steel? Does it mean that Mr. Weir is sore at U. S. Steel? Does it mean that there will be a sharp cleavage in the ranks of steelmakers? It would be easy to say "of course not," but that's too easy. There are enough steel men in the industry today who have the same thoughts as Mr. Weir to add up to a break in the solid front of statesmanship.

Because E. T. Weir believes that the industry will suffer a mortal blow if expansion is not rushed, if the money is not available, if things drag on as they have, he is willing to be classed perhaps more than a lone wolf. But that doesn't faze him now that he has made up his mind how hard the fight will be to get what he thinks the industry is entitled to.

This is what Mr. Weir wants: A fast-growing steel industry that will get its customers off its back on recurrent shortages. He wants higher steel prices to pay over and above the expansion costs that will have to be borrowed. He wants the "independents" to speak out and act with more free-wheeling action. He wants steel people to know that when the roll is called in the years to come the present steel leaders will be completely responsible for any steel shortage; for any harm to the industry, and for any road block to progress.

Others want all this, too. But to put it bluntly, Mr. Weir wants it now without what he seems to feel has been too much pettyfogging. The lone wolf is at it again because he feels he doesn't want to be allied with sheep.

LABOR

McDONALD: David And Goliath

Pre-negotiation bickering between U. S. Steel Corp. and United Steel Workers offset previous good will . . . Exchange could shorten odds favoring steel labor peace.

◆ STEEL LABOR negotiations are better than a month away. But the two principal participants—U. S. Steel Corp. and the United Steel Workers—are shouting at each other already.

U. S. Steel fired the opening gun with an economic lecture in its annual report, in which it blamed big unions and ambitious union leaders for contributing to inflation. The Government's "full employment" policy also was lambasted by Roger M. Blough, U. S. Steel's chairman.

David J. McDonald, president of the steel union, was aroused by the "gratuitous insult" to the USW and organized labor generally. He wondered whether some people in U. S. Steel were trying to tear down the friendly labor-management relations built up during the last couple of years.

"We trust this is not the case," said Mr. McDonald.

Hits Price Rise

At the same time, he put Big Steel on the griddle for raising prices too much. Oddly enough, E. T. Weir, of National Steel Corp., chose the same day to be critical of U. S. Steel for not raising prices enough.

Mr. McDonald contended that last year's price advance of $7.35 per ton was more than enough to offset the previously-negotiated wage boost of 15 cents an hour. Increased productivity, said Mr. McDonald, actually lowered the wage cost of a ton of steel after the 1955 labor settlement. He also was critical of the recently-announced advance in tin plate prices, which goes into effect in April.

Steel producers and steel labor are talking down the possibility of labor trouble later on this year.

Odds For Peace

But the USW is cooking up a costly package to toss at the mills, including supplemental unemployment benefits, higher wages, premium weekend pay, and improved social benefits.

Prior to the U. S. Steel-McDonald exchange, the odds favored a peaceful settlement. The temperature reading this week shows the pendulum swinging a bit toward the pessimistic side.

Mr. McDonald reacted sharply to Mr. Blough's reference to the so-called rivalry of union leaders as a factor in generating inflationary trends. Said Mr. McDonald:

"Only the chairman of the board and the financial manager of the steel corporation, whose horizons are limited by Wall Street, could regard the efforts of steel workers to obtain better wages, pensions, and security for themselves and their families, to be solely the result of competition between union leaders seeking 'always to out-do each other in elevating employment costs.'"

He added:

"Some of these gentlemen seem to know little about human values. They also seem to ignore basic economics."

At their "Operations Soundoff" meeting in Chicago several weeks ago, steel union leaders indicated they would go after a sizable economic and social package from steel producers this year. Some observers have put a near-40¢ per hour price tag on the union program. However, USW demands have not been formalized, and it's not known how much of their program will be tossed into the hopper for bargaining purposes only.

FUEL

OIL: Middle East Strife Means Trouble

Shooting war in Middle East means trouble to industry here at home . . . Obligations to allies would stretch resources in case full scale war breaks out . . . U. S. supplies adequate only for own use—*By G. G. Carr.*

◆ YOU CAN THINK what you want about who is right and who is wrong in the current Middle Eastern crisis. But you can't escape the fact that a shooting war there will have a serious impact on your manufacturing operations in this country.

The reason is easy: oil. The Middle East's oil reserves have been estimated as high as 75 pct of the world's known supply. While this country could get along (at least for a while) on domestic production plus Venezuelan and Canadian output, our allies in Europe must look to the Middle East for as much as 95 pct of their oil supply. And if that area should yield to the Russians, who have only about 7 pct of known world oil reserves, the result would be an almost incalculable blow to the Free World.

In 1955, this country imported almost 285.5 million barrels of foreign crude oil. Of this, the majority came from Venezuela—138.8 million bbl, according to American Petroleum Institute. But almost 93.5 million bbl from the Middle East came to the United States.

TRAINING supervisor Tom Langley discusses operations with Arab trainees in front of aluminum painted pipes and valves of a crude oil topping unit at Arabian American Oil Co.'s Ras Tanura refinery in Saudi Arabia.

Import Picture

If we were completely isolated from the rest of the world, we could produce all the oil we consume. Daily U. S. production runs 6.5-7 million bbl daily, and imports about 1.2 million bbl per day. World oil output and consumption are about 14 million bbl daily. About half of U. S. imports are from Venezuela. Since domestic capacity is about 8 million bbl daily, throwing our standby capacity of 1-1.5 million bbl into operation would fill the gap, at least temporarily. But some oil experts believe we couldn't keep it up for more than a few months. And this would almost certainly mean sharp price rises for petroleum products.

But this view neglects several important facts. Free World defense makes it essential that our allies be supplied with oil. And if Middle East supplies were to be cut off, the U. S. would immediately be the chief Free World oil source. Even though we could supply our own needs, at least on a short-term basis, Washington says it would probably be forced to impose rationing.

Even if we are able to supply at least the minimum defense needs of our allies, the problem of transporting our oil from, say, the Gulf of Mexico to Europe would become a real problem. The existing tanker fleet is inadequate to move the tremendous volume of oil needed in Europe every day—2.4 million bbl in 1955. Added to this would be the formidable problem of supplying our own Army, Navy and Air Force installations.

And any possibility of supplying our allies is based on the forlorn hope that trouble in the Middle East will stay there. There is almost universal diplomatic agreement that the Arab world is the most likely percussion cap for World War III.

Other problems loom, even if trouble in the Middle East can be confined there. Fuel oil grade most generally used in openhearths, for example, is Bunker C, a residual oil, much of which currently comes from Venezuela. But remarkable results are now being obtained from further refining of Bunker C to yield other valuable petroleum products, including gasoline. In time of shortage, Bunker C should be even more sought after, at considerably higher prices. This could cause some substantial changes.

IRON ORE: Why Shippers Rush Season

Ore carriers are ready for near-record season . . . Steel boom and heavy blast furnace use mean big demand for ore . . . Shippers expect to move almost 95 million tons before freeze next fall—By T. M. Rohan.

◆ IRON ORE shippers on the Great Lakes are getting up a full head of steam this week with a good season already in the bag and a record breaking one a possibility.

Just about anything that will float will be out at the first crack in the ice around the critical Soo locks. A firm steel market for the year assures heavy shipments and blast furnace consumption is running far ahead of last year.

"The outlook has suddenly become better in the last month probably because the softness in steel markets simply did not materialize," one shipper said in Cleveland headquarters last week. "A month ago it looked like a good year. Now it looks like an excellent one." The regular crystal ball gazers are generally refusing to gaze publicly this year on total tonnage shipments because of changes in conditions.

At lower lake ports a full fleet of 260 ore boats is ready to go at the first sign from the Coast Guard that ice in critical Whitefish Bay, north of the Sault Ste. Marie locks can be passed. Pittsburgh Steamship Div. of U. S. Steel, has set March 31 as sailing day. The maximum number of boats in service at any one time last year was 155 and some of these did not get in service until July.

Predictions

Tonnage predictions on ore this year range from 90 to 95 million tons compared to 85.5 million last year and 95.5 in 1953. Last year's figure represented 79.6 pct of the 107.3 million tons shipped from U. S. districts. Second best district was the West at 7.8 million tons. On total commodities shipped, carriers feel they may set an all time high of 200 million tons compared to the previous high of 199.6 million tons in 1953 and 193.7 million last year. Heavy demand for coal, limestone and dolomite may push total shipments over the top.

The furious pace of steelmaking this year is, of course, the underlying reason for the urgency in getting ore down to blast furnaces this year. Other factors are—

1. Consumption of iron ore at lower Lake ports over the winter has been over 1 million tons higher per month than last year.

2. Most steel companies are now and will continue to use higher percentage of hot metal in openhearth charges to avoid a runaway scrap market. So blast furnaces are being pushed to the limit. January and February consumption this year was 15.3 million tons compared to 13 million last year.

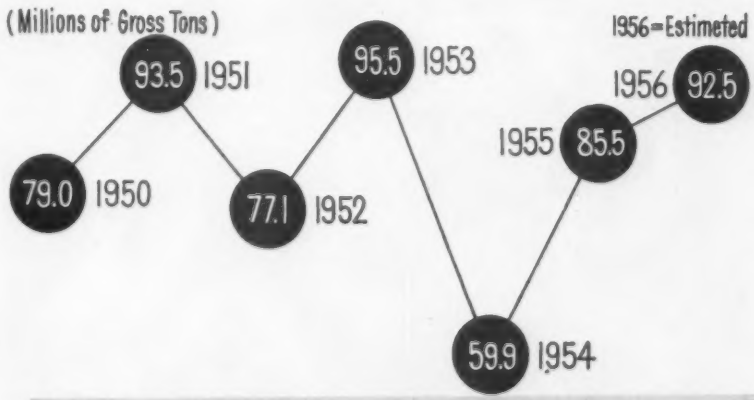
3. Railroad freight car shortage is increasing with scrapped cars exceeding production, throwing heavier load on the Lakes boats.

No Trans-shipping

4. But there will be a greater influx of foreign ores this year. Shipments last year from foreign countries were about 23 million tons and indications this year are for 30 million or more. Although a minor portion comes into the Great Lakes area, in some steelmaking centers it displaces markets normally served from the Lake Superior district.

Good planning of shipments last year has practically eliminated trans-shipments of special grades between mills over the winter.

Lakes Ore Shipments



EDUCATION

CONSUMER COURSES: Teach 'Em To Buy

Product use instruction courses gaining popularity . . . Pays off for manufacturers in prestige, improved competitive position . . . Helps consumers lower operating costs—*By F. J. Starin.*

◆ MORE manufacturers and fabricators than ever before are picking up the tab for customer and distributor training courses. The reason: it is paying off in terms of increased sales, better competitive position and company prestige.

"We must admit that most products offered on the market today are quality products . . . the most important single factor . . . service," insists Harald T. Reishus, vice president of Industrial Power Div., International Harvester.

Bringing a customer into a classroom and demonstration area serves two major purposes: (1) It advances company prestige and reputation for service by teaching advanced and specialized techniques valuable in his business. Carboloy dept., General Electric Co., manufacturers of carbides and carbide tools, has been training customers for 14 years. Carboloy claims many of its trainees have reported operating costs cut by 25 to 70 pct through proper direct application of tools, proper brazing, handling and storage.

And (2) it gives the instructor opportunity to explain in more detail the advantages of his product.

International Harvester recently set up a power service training program in 5000 ft of extra space at its Melrose Park, Ill. plant. It includes classrooms, auditorium, shop area, tool room, display area.

Eutectic Welding Alloys Corp., Flushing, N. Y., manufacturers of rods, electrodes and fluxes, teaches advanced welding techniques and use of its products in two average-size rooms. One is a classroom for formal instruction, and the other a shop with torches for demonstration and practice.

Instructors generally are members of the technical or research staff.

Necessary equipment varies widely, depending on the particular industry. Some form of visual aid is a must. Most companies utilize motion pictures or slide films, charts or working models.

Where mechanical components are involved, units for tearing down are helpful.

Where techniques, rather than mechanical knowhow, are the object of instruction, samples of results possible are a must. Both Carboloy and Eutectic use exhibits.

PURCHASERS of carbide tips and tools from the Carboloy Dept. of General Electric are offered courses in proper use and maintenance of carbides given by Carboloy experts in company's Detroit headquarters classrooms.

Related Payoff

A well-run program can also pay off in related branches of sales promotion. Ordnance and maintenance specialists of the armed forces are eager to attend schools which will help them advance in grade. Military policy permits this in most cases. Product education on lower echelons can make it easier to land profitable government and defense orders.

Many of Carboloy's most successful courses have been right in the plant of a potential customer.

District Sales Managers, and in some cases salesmen for Eutectic are provided with information and material for 1-day clinics.

Eutectic sales promotion dept. has recorded the formal instructions given at its school on two long - playing records, packages them in an eye-catching album available to customers, prospects, distributors and even future welders, students at engineering schools and colleges.

Scores Surplus Sales

Bargains for buyers of military surplus property may amount to excessive losses of public funds because the sellers use inefficient disposal methods, a new congressional report charges.

During fiscal 1955, the Senate Armed Services Preparedness subcommittee points out in its report, the Defense Dept. disposed of surplus materials which had originally cost more than $1.4 billion. For these properties the military received $143.5 million, for an indicated return of 10.2 pct.

But this return should be reduced for accuracy's sake by more than $40 million realized from the sale of scrap, says the subcommittee. Its report calls attention to the ommission of acquisition costs of materials which generated the scrap, in the listing of original costs of the property. The report holds that the adjusted return on the 1955 sales was 7.3 pct.

Surplus materials are going to be disposed of at the 1955 rate, or an even higher one, this year and next, according to the subcommittee. It strongly urges the Defense Dept. to work toward a higher return from its sales by seeking better marketing means, especially auction sales.

LARGEST gas turbine engine of its type ever installed in a U.S. Navy boat, the 500 hp Juniper carries executives of Solar Aircraft Co., manufacturers, and high ranking Navy brass across San Diego Bay at speed of 26 knots—double the rate possible with a conventional engine.

Mobilization:

U.S. defense measures shift to "quick war" principle.

Emphasis on this country's industrial mobilization planning is shifting to the new atomic age "quick war" principle. We must be able to snap back from an attack in almost nothing flat.

With that in mind, the Office of Defense Mobilization is taking these steps:

War Readiness: Plans for continuity of government, mobilizing industrial reserves, will be tested this spring. Executive reserve will be set up this year. Studies of war damage compensation as a means of re-establishing credit system, are underway.

Production: First supply-requirement analysis of how much capacity would remain after atomic attack will soon be made. Tax amortization and loan expansion goals will be reviewed to meet these needs. Buildup of machine tools and other production equipment continues. Government wants industry to protect records, plants, men, in attack.

Dispersal: New dispersal policies, based on possible H-bomb and fallout damage, are in effect. Air Force wants at least two suppliers of each item. Government-owned facilities may be dispersed. Stockpile, now with 75 pct of minimum needs on hand, may be relocated to protect materials from bomb or fallout damage.

Manpower: ODM is trying to estimate manpower survival after attack, develop plans to use it most effectively, locate specialists in most important industrial rebuilding.

GSA Sells Foundry

The Government's multi-million dollar foundry at New Castle, Pa., will be auctioned off, following congressional criticism of an earlier plan to sell the facility directly to United Engineering & Foundry Co.

General Services Administration had proposed to sell the foundry to United, sole bidder eight months ago, for a negotiated price of $7.5 million.

In recent weeks, however, other firms have expressed interest in the property. Sale will be held April 20 at GSA headquarters in Washington, D. C. Bidding will continue for an hour after bids are opened at 2 p.m. The foundry represents 40 pct of the nation's heavy casting capacity.

Feature Air Drop Show

Air drop of a number of military supplies will feature an aerial delivery conference by the armed forces at Camp Pickett and Fort Lee, Va., on April 3, 4, and 5.

Army, Marine Corps, and Air Force units, with the Army Quartermaster Corps as sponsor, will take part. Officials from private industry and the government will witness the demonstrations.

Principal reason for the sessions is to foster new thinking on the future aerial delivery problems. The conference also is intended to encourage coordination between industry and the military.

EXPANSION IN INDUSTRY

Amortization:

Transportation, power get rapid write-off permission.

◆ EXPANSION in the transportation and electric power generating fields has been stimulated by new government grants of fast tax write-off certificates for 68 projects to cost $418.8 million.

Freight car building is especially affected since the Office of Defense Mobilization has approved certificates covering construction of well over $200 million worth of new cars. Accelerated tax write-off for 85 pct of these projects is permitted by the ODM action.

Southern Pacific Co., San Francisco, gets a certificate to aid in the purchase of $91.4 million worth of freight cars. Chesapeake & Ohio R. R. Co., Cleveland, holds a write-off permit for a $49 million car order, and Union Pacific R. R. Co., Omaha, has one for $20.1 million worth of cars.

Appalachian Electric Power Co., Dexter, Va., has a certificate for fast write-off of 65 pct of its proposed expansion of power producing facilities, expected to cost $62.8 million. Texas Gas Transmission Corp., Owensboro, Ky., gets a permit covering 25 pct of a $20 million gas pipeline project.

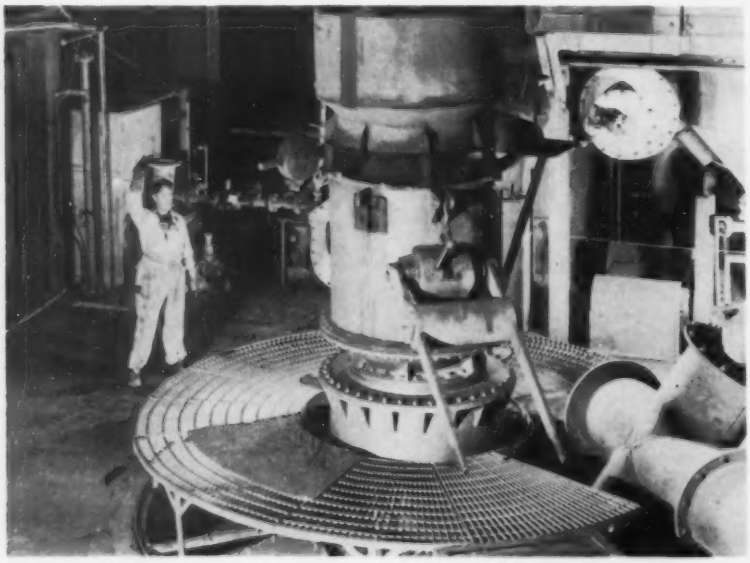
ODM now has granted write-off permits for 20,712 new industry projects with an anticipated total cost of $34.2 billion. Of this amount, $20.6 billion has been certified for rapid amortization.

Bliss Rolling Mill

E. W. Bliss Co., Canton, O., has awarded a contract to Luria Engineering Co., Bethlehem, Pa., for construction of a 15,000 sq ft extension to its rolling mill at Salem, O.

The new building will be a standard steel-frame structure.

Plant addition is expected to be ready for production by the beginning of May. Cost is estimated at about $500,000.



TITANIUM ore is charged into chlorinator, an early step in production of the metal, at Titanium Metals Corp. plant at Henderson, Nev. Expansion program will increase capacity of the installation by 2400 tons in 1956.

Expansion Briefs

W. R. Grace & Co., New York; joint investment in permanent non-electric magnet alloys plant in Brazil with Eriez S. A. Produtos Magneticos e Metalurgicos, subsidiary of Eriez International Corp., Erie, Pa.; cost about $1 million.

Westinghouse Electric Corp., Pittsburgh; will construct, world's first industry-owned nuclear materials testing reactor at Waltz Mill instead of Blairsville, Pa. as originally announced.

Colorado School of Mines, Denver; multi-million plan for future expansion including college union, dormitories and an armory.

Nitrogen Div., Allied Chemical & Dye Corp., New York; installation at Hopewell, Va. plant of facilities for production of Ammonium nitrate; expect production by end of 1956.

Acme Steel Co., Chicago; new office building in Riverdale, Ill.; cost about $1.5 million.

Beckman Instruments Inc., Fullerton, Calif.; new plant for production of electronic components at Newport Beach, Calif.; cost about $2 million.

Holgate Brothers Co., Kane, Pa.; expansion of wood turning and wood product manufacturing facilities.

Metal & Thermit Corp., New York; **United Chromium of Canada, Ltd.,** Toronto; combine Canadian activities under name of Metal & Thermit - United Chromium of Canada, Ltd.

B.F.Goodrich

3000-degrees hot but doors don't melt

A typical example of B. F. Goodrich improvement in rubber

THERE'S melted steel inside those big furnaces. Temperature is 3000 degrees. The heavy steel doors would melt in minutes except for that hose that carries a stream of cooling water in and out of them.

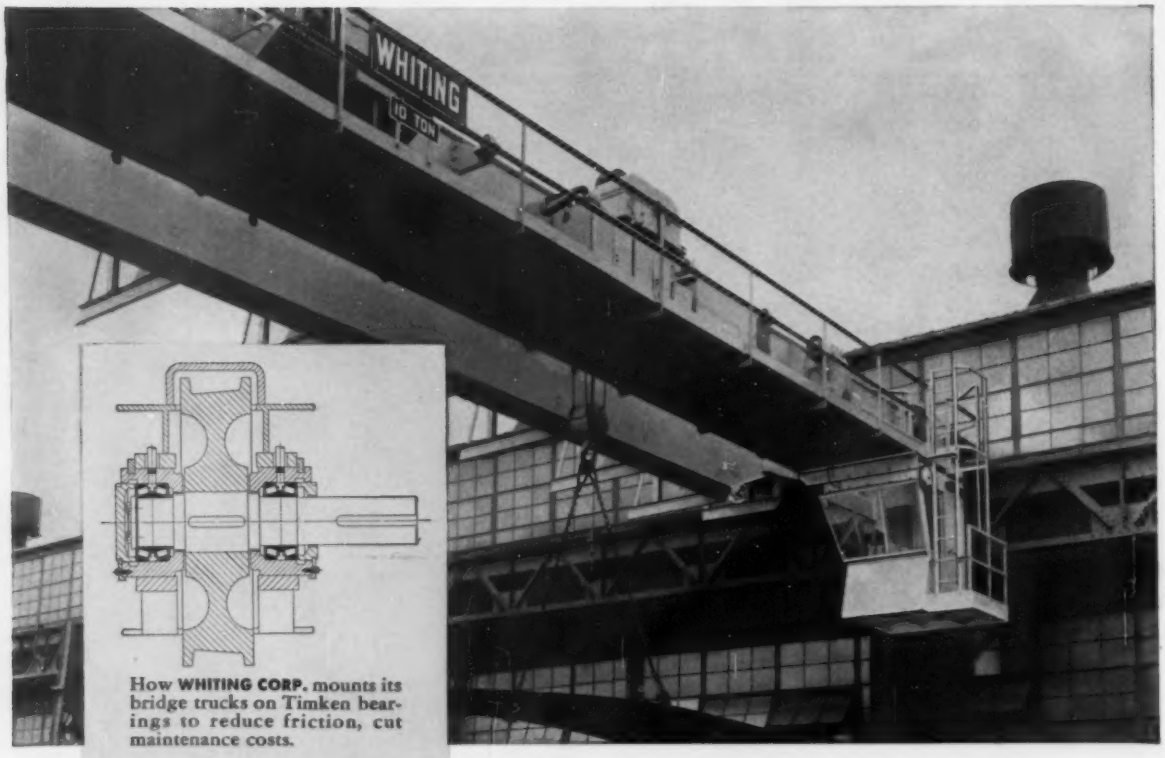
But hose was burning out in months or even weeks. It had to stand heat 24 hours a day, seven days a week, was often banged by big "charging machines," spattered with hot metal. Then B. F. Goodrich developed a new kind of hose made of wire, asbestos and rubber. It had been in use more than a year when the above picture was taken. It is less expensive than the hose used before, is much lighter and more flexible, easier for workmen to handle. One man can install it where two men were needed for other hose.

B. F. Goodrich has made hundreds of improvements in dozens of kinds of hose to make them last longer, cost less, save your time and money. Most improvements, while making the hose stand more abuse, have also made it more flexible and easier to handle. B. F. Goodrich makes hose to carry almost anything—air hose that stands sharp flying rocks outside and hot oil inside, burstproof steam hose that can't burst even if it wears out, hose that lasts for years carrying gasoline, paints, chemicals, even dry materials such as flour or cement.

Call your B. F. Goodrich distributor for more information about any kind of hose, belting or other rubber products. *The B. F. Goodrich Company, Department M-583, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS DIVISION



How **WHITING CORP.** mounts its bridge trucks on Timken bearings to reduce friction, cut maintenance costs.

Why Whiting switched to TIMKEN® bearings for its traveling cranes

THIS ten-ton capacity overhead traveling crane, like all other heavy-duty Whiting cranes, uses Timken® tapered roller bearings to keep it traveling. Timken bearings now are used in the bridge trucks of Whiting cranes because they can take the heavy thrust loads by themselves and perform better with less maintenance.

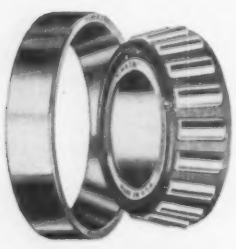
Timken tapered roller bearings take *both* radial and thrust loads in any combination without the conventional thrust collar which Whiting previously needed for this type of overhead crane. Timken bearings practically eliminate friction because they are geometrically designed to have true rolling motion and are made microscopically accurate to conform to their design.

Because Timken tapered roller bearings reduce friction to a minimum and make possible the handling of larger thrust loads, maintenance is lower and production is higher.

We make our own steel to insure highest bearing quality. We're America's only bearing manufacturer that does.

Whiting Corporation knows that Timken bearings help their cranes do a better job. No wonder they have changed over 100% to Timken bearings on their bridge trucks. Whether you build or buy machinery, make sure it has Timken bearings. Look for the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roller ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

Only Timken tapered roller bearings have these advantages: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. Timken fine alloy steels.

NOT JUST A BALL ◯ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ↔ LOADS OR ANY COMBINATION ✳

REPORT TO MANAGEMENT

Do You Watch the Right Figures?

You can get yourself into a mental state if you are pre-occupied with the wrong side of the financial page. You can be alarmed one day over the increasing total of consumer credit. The next day you can be equally concerned over a drop in credit buying.

This is just an example of the conflict of interpretation of economic trends. But you can save yourself a lot of confusion if you avoid needless alarm over meaningless statistics.

One thing to keep in mind is that what's important to one business or industry doesn't necessarily apply to all. But you can be helped if you watch the right set of business indicators.

There's no guarantee against misinterpretation. That's up to you or your advisors. Keeping yourself informed on general business conditions is helpful in itself. It also helps prevent you from being misled by isolated or specific sets of statistics that can give the wrong impression if not interpreted correctly.

What To Look For

In preparing your own evaluation of the overall business picture, here are some indicators that will be most helpful:

Basic sets are gross national product, disposable personal income, Federal Reserve index of industrial production, consumer's price index, money supply, bank debits, personal consumption expenditures.

Other less general indicators worth watching are retail sales, employment, construction activity, expenditures for new plants and equipment and wholesale prices.

One word of advice: Don't get too involved with strictly financial statistics. There is a tendency to compare today's picture against yesterday's without taking into consideration the changing conditions.

Why Bother At All?

Probably the big reason why general business indicators are important is the danger of bucking a trend. This applies just as much or more to pulling in your horns when everything points up as to making big plans when indicators point to a contracting economy.

For the record, that's the way things stand today. While a few consumer indicators show moderate cutbacks, the big picture is entirely favorable. The rest of 1956 will go down as a boom year, at the worst slightly under 1955, possibly better.

How's the Money Market?

Business both large and small is in an expanding mood. While there has been a moderate easing in money in recent weeks, the outlook for the next few months indicates tighter money for business, particularly small business.

One leading commercial finance company estimates that in the next 12 months 5000 small manufacturers in the metalworking industry will require $50 million to fulfill contractual commitments.

On the other hand, easier mortgage money is one of the factors responsible for the new activity in home building.

GI home loan appraisals increased 32 pct over January, a jump that's partly seasonal as well as financial. The figure of 63,420 appraisals is well below the record 104,188 a year ago, but 50 pct over the February average of the past four years.

But FHA forecasts about the same amount of home building this year as last, within 5 pct of the record 1.3 million new housing starts.

INDUSTRIAL BRIEFS

Without Strings . . . U. S. Steel Foundation, Inc. has pledged $300,000 to the University of Chicago, Northwestern University and Illinois Institute of Technology. The institutions will receive unrestricted grants of $100,000 each towards endowment, building fund or other facilities' needs to be used at their discretion.

Wheeling Dealing . . . Wheeling Steel Corp. will gradually transfer all operations from its Wheeling factory to other fabricating plants of the corporation in a move aimed at improving operating efficiency.

Bohn Takes Betz . . . Bohn Aluminum & Brass Corp., Detroit, has acquired all assets of the Betz Corp., Hammond, Ind. Betz manufactures a line of heat transfer equipment for commercial refrigeration and air conditioning. The new facility will be operated as a division of Bohn.

Model Certificate . . . The Alco Products, Inc., Schenectady, N. Y., scale model of the full sized Army Package Power Reactor, which the company is building for the Atomic Energy Commission, was instrumental in the award of a certificate of merit by the U. S. Information Agency for what the USIA calls "outstanding assistance to the international information program." The model was shown in Japan in connection with the "Atoms for Peace" exhibit sponsored by the USIA.

Southern Development . . . Southern Mill & Foundry Supply Co. is being formed as franchised distributor of Shallway Corp., Connellsville, Pa., complete line of Shalco shell molding machines and Shalco shell core blowers. The company will service these and other items of Shalco equipment throughout the Southern states.

$25,000 Wall . . . Aluminum Co. of America and the National Association of Architectural Metal Manufacturers are awarding $25,000 in a competition to prompt new ideas for the design and construction of hypothetical aluminum curtain wall buildings.

Big Chunk . . . The W. L. Maxson Corp., has acquired a substantial interest in Roger White Electron Devices, Inc., Ramsey, N. J.

Spring Investment . . . Assets of the Woodside Power Loader Div., Woodside Industries, Milwaukee, have been purchased by L. A. Young Spring & Wire Corp. Price together with initial product development expenditures involve an investment of approximately $500,000.

"Try this on for laughs"

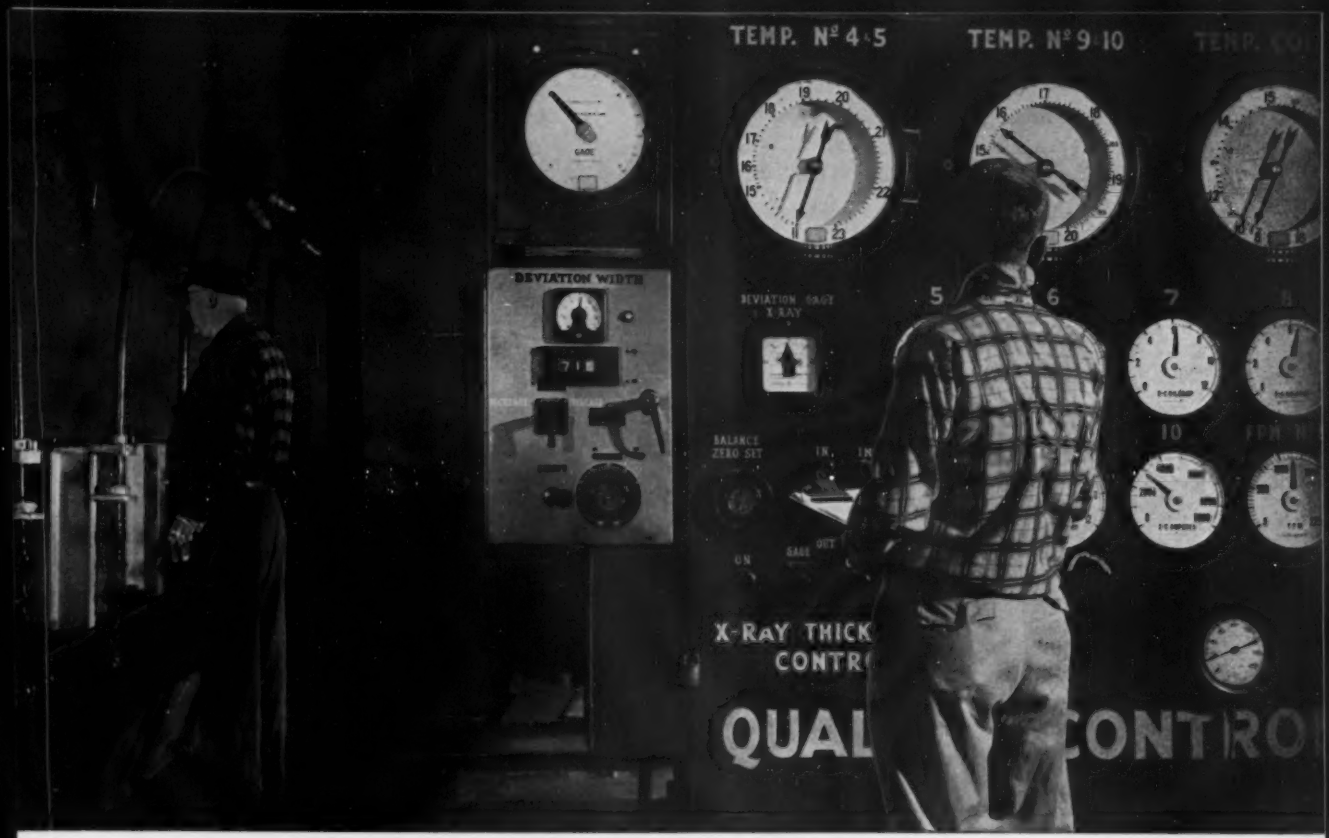
Looking Back . . . The Saugus Ironworks, "birthplace" of America's iron and steel industry, will be open to the public on Tuesday, April 17th. The Works were rebuilt in 1954 by the American iron and steel industry to dramatize the historical and educational significance of the pioneer plant. More than $1,500,000 went into the research and reconstruction to make the ironworks an authentic reproduction of the original.

Bouncing Higher . . . World consumption of man-made rubber will reach new all time high this year, exceeding the 1955 record by 100,000 tons or about 10 per cent, according to W. S. Richardson, president, B. F. Goodrich Co.

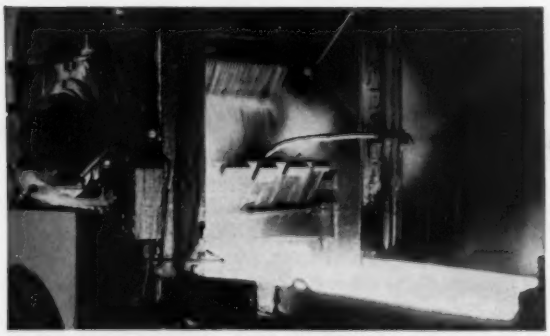
Housing Project . . . Vandergrift, Pa., plant of United Engineering & Foundry Co. has just cast two rolling mill housings. Each with an expected finished weight of 400,000 lbs requiring 600,000 lbs of molten metal in pouring. They are believed to be the largest ever produced in this country. At least three weeks of cooling will be required before the castings can be removed from their molds.

Canadian Castings . . . Canadian companies turned out 905,400 tons of iron castings in 1955, 27 pct more than the 713,900 tons for 1954. Shipments amounted to 66,500 tons compared to 519,100 tons in the previous year.

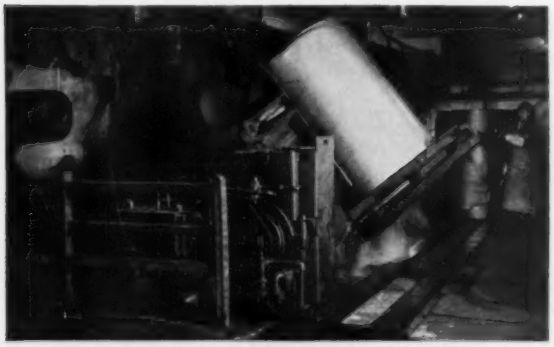
Farsighted . . . Allegheny Ludlum Steel Corp. is initiating a new college scholarship and fellowship program this year aimed at helping about 65 college students each year. The awards will fall into three general categories, including graduate fellowships, achievement awards and scholarships.



How Great Lakes Steel *guides* quality



FIRST QUALITY CHECK is made at No. 1 Mill Stand. Here, an electronic pyrometer relays the strip's temperature to the panel.



FINAL CHECK in this operation is made at the coiler. From slab to coil, the control panel spells far better quality.

Here's one of several electronic operation panels that take the guesswork out of quality control at Great Lakes. You'll find this one guiding the entire operation of the 96-inch continuous mill.

As the red-hot strip races from roll stand to roll stand and on to the coiler, the temperature, speed, width and thickness of the strip *at each stage* are instantly shown on the panel.

A glance at the panel tells the operator if any adjustments are necessary to assure a finished product of the highest quality—a product that will stand the rigid test of your specifications.

This is further proof that Great Lakes has what it takes—the experience and the very latest equipment—to make your product even better. Our representative is just one telephone call away.

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

AUTOMOTIVE ASSEMBLY LINE

You Won't See 1957 Models in August

Stories of early auto introductions are largely rumor . . . Big reason is that it would aggravate cleanup problem . . . Sweeping changes create jam at die shops . . . Staggered introductions possible—*By T. L. Carry.*

◆ PREDICTIONS of an earlier than usual introduction of 1957 cars have been circulating in Detroit ever since the recent sales slump hit the industry last December.

The theory is that an early introduction would help offset the sales lag and still make 1956 the second best year in the industry. The basic changes that are in the works for next year's cars would be the biggest factor in stimulating the public to buy.

If it was that simple, an early introduction would be the best thing for the industry. But this is not the case.

Looking Up . . . Sales of new cars, although not as good as last year, are getting better every day. Moving up the introduction dates for 1957 models would make the 1956 cleanup period that much more difficult. The cleanup job this year is going to be big enough without making it more difficult.

Also, the automakers can't bring new cars out much earlier even if they want to.

New models aren't brought out in a matter of weeks. It takes a minimum of at least 4 years' planning before a car reaches the production stage and the 1957 car is no exception to the rule.

One of the biggest delaying factors this year for the automakers is the status of their tool and die programs.

Biggest Program . . . It is hard for an individual to grasp the size of the program for next year's models. It is the biggest that has ever been undertaken by the automobile industry.

Every automaker, including some who have their own captive shops, is having difficulty getting the work done. The small shops are so busy around Detroit that they are turning down work that has to be done before the new cars go into production.

It is significant to note that most of these independent shops expect to be busy right through the end of this year. Normally, their work would be finished by the end of August.

There are two possible reasons for this development. Either the program is so big that the auto companies are forced to space their introductions or the bigger firms that can afford it are switching to a significant change every model year.

Because of the costs involved, it seems unlikely that the latter would be true. Such a cycle of major changes would practically kill off the Independents in the business.

Tool Builders Busy . . . It is more plausible to believe that it is impossible to get all the changes planned into production in time for a normal introduction of new models.

Machine tool builders in the area are also swamped with work. Delivery on some types of machines is anywhere from 18 months to 2 years.

One reason for the extended de-

Will Lincoln Switch to Unitized Body?

◆ RUMORS persist in the industry that the Lincoln Div. of Ford Motor Co. is going to be the first of the Big Three to switch to unitized body construction currently being used by American Motors Corp.

Lincoln is supposed to make the change for its 1957 model. There are several reasons given for the prediction.

One is that Lincoln's manufacturing facilities are not as extensive as those of other Ford products. The cars are produced in only two places, Wayne, Mich., and Los Angeles.

Secondly, because of the costs involved in a changeover, it would be logical to assume that unitized construction would first be introduced on a more expensive type of car.

Finally, the unitized body would fit in very well with Ford's current safety campaign.

In a unitized body, the frame is welded into the body, thus making a single unit.

It was first introduced on Nash cars in 1940 when Nash was part of the Nash-Kelvinator Corp. The construction was adopted by Hudson in 1948 and is now used on all American Motors Corp. cars.

AMC claims that single unit construction is one of the greatest safety features ever introduced in the industry and is currently backing up the claim by giving an accident insurance policy.

It will be interesting to see the industry's reaction if Lincoln does adopt the unitized body. For some producers, the costs involved in a switchover would be prohibitive.

Going to extremes to satisfy every need in fasteners

WHAT's the size-limit on nuts? Pretty high at RB&W, as you can see from the 4" giants above. At the other extreme, RB&W produces nuts down to 1/8". Everything in between, too.

Most are made on automatic nut formers. Big stuff gets milled from hex bars, and needs more personal attention. Frank Culko, long on skill and precision, is shown keeping his expert eye on the operation. Like so many other RB&W craftsmen, he's been with the company for well over 20 years.

There's plenty of production skill and experience, plenty of facilities behind the avalanche of nuts flowing from RB&W. In fact, it was RB&W that developed the first cold-punched-nut machine, the first continuous automatic nut tapper, and pioneered the cold forming process. Also a fact: RB&W recently invested millions of dollars in bolt and nut making equipment to expand capacity.

RB&W goes all out on quality control, too... with a program recognized as the finest of its kind.

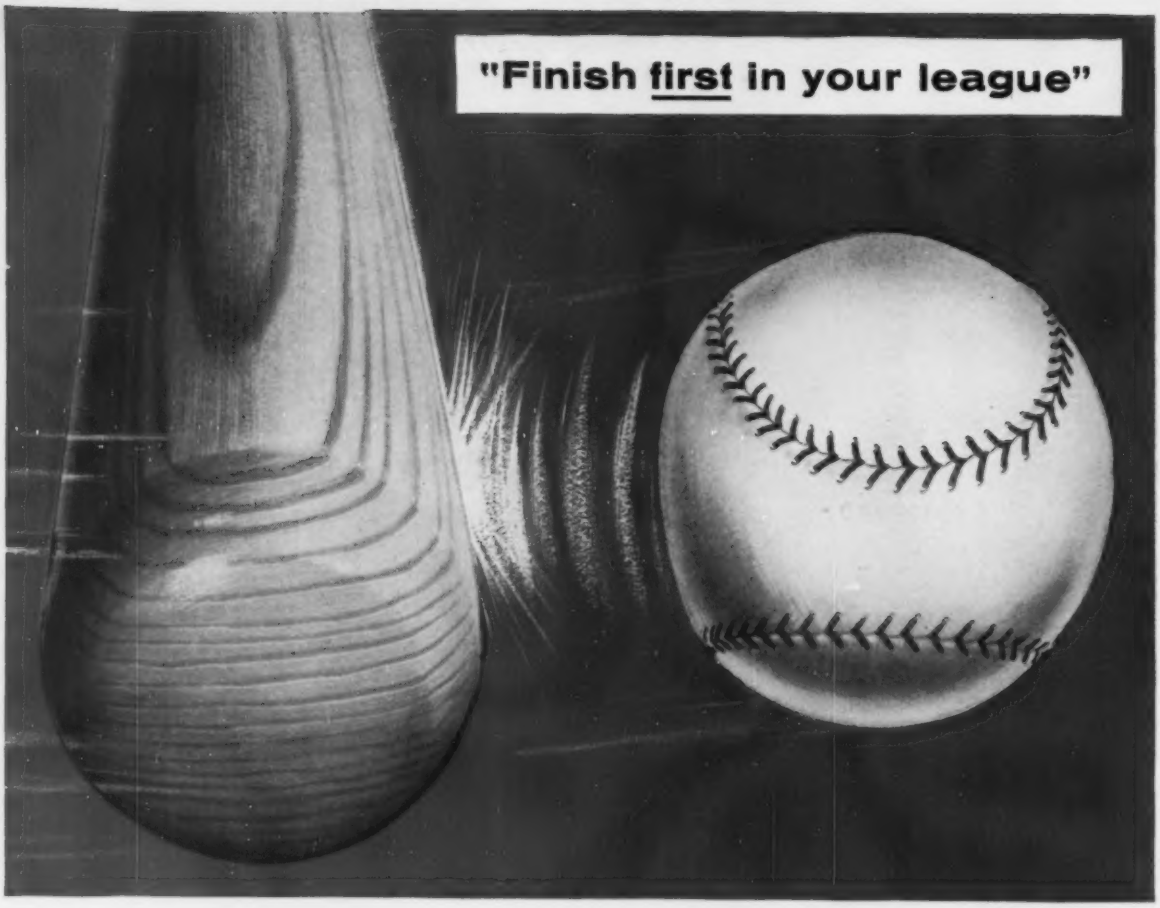
What does all this mean to *you*? More quality for your money. A truly reliable source of supply. Strong fasteners that never let you down.

Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, N.Y.

R B & W

110th year

Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Seattle. **Distributors** from coast to coast.



. . . with J&L COLD FINISHED LEADED STEELS

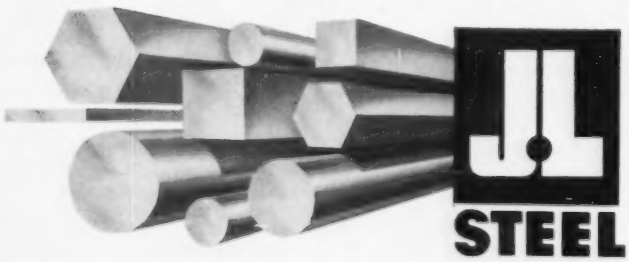
These modern, superior J&L Leaded free-machining cold finished steels are meeting with outstanding acceptance in machine shops everywhere. They are a star member of the complete line of premium quality, free-cutting cold finished bar steels produced over the years by J&L specialists. Thus, we can recommend the right type to help solve your machining problems.

Available in *both Bessemer and Open-Hearth grades*, J&L Leaded steels offer:

- **SUPERB MACHINABILITY**—because they enable you to use optimum cutting speeds, to secure longer tool life and to produce superior surface finishes.
- **GREATER UNIFORMITY**—because they are completely J&L-produced from the basic raw materials to guarantee optimum uniformity so necessary for today's high-speed machining operations.
- **HIGHEST QUALITY**—because they must meet the rigid quality standards developed by J&L through years of leadership in the development and production of free-cutting steels.

Adequate stocks of all J&L cold finished free-machining steels are available in important industrial centers. Phone the nearest J&L District Office or your Distributor for prompt and efficient service.

Pick the Free-Machining Steel that serves you best—from J&L's complete Cold Finished Line



Jones & Laughlin
STEEL CORPORATION · PITTSBURGH

COLD FINISHING PLANTS AT PITTSBURGH, PA., AND HAMMOND, IND.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
MARCH 24, 1956	141,186*	26,426*
MARCH 17, 1956	140,962	26,052
MARCH 26, 1955	187,993	29,354
MARCH 19, 1955	186,066	26,710

*Estimated. Source: *Ward's Reports*

livery is the shortage of qualified engineers, and delivery time is measured in the number of engineering hours required to do the job.

In addition, the auto companies keep changing specifications, thus adding to the delaying factor.

So the chances of an earlier than usual introduction of new cars this year is pretty remote. However, it's best never to sell the automobile industry short.

The various companies aren't miracle workers but it is possible that under a crash program model introduction might be advanced 3 weeks at the most. It is more likely that the new cars will make their bows at just about the same time as last year.

Auto Sales:

Gloom fades as March sales show upturn.

The gloomy predictions that were coming out of Detroit a few months ago regarding sales and production of new cars have suddenly disappeared.

With sales continuing to increase and production held at a normal level, it appears that by the end of the month producers will make a dent in new car stocks which have been at record highs since the latter part of 1955.

New car sales for the first 10 days of March continued their upward climb, according to Ward's Automotive Reports. The reporting service says that sales for the period totalled 196,000 units which is 13.5 pct above the same period in February.

Chrysler Gains

It is the best record the industry has set for a 10-day period since last August and Ward's expects deliveries for March to hit a total of 610,000 units. This compares with 513,000 in February and 699,000 in March of last year.

Buick, Lincoln and Rambler are among those reporting increases in deliveries. Chrysler Corp., which suffered more from cutbacks than any other producer, got an improved share of sales for the period with 19.9 pct. This compares with 17.6 pct penetration in February and 16.4 pct in January.

Antitrust Versus GM

Some government antitrust experts are talking of paring down —moderately—the General Motors empire. Extremists favor big-scale dissolution of GM into many small firms, but the more moderate view prevailing around the Justice Dept. is that GM could avoid a government antitrust suit by spinning off one or two of its divisions.

Various combinations, like Oldsmobile and Buick, or A-C Parts and Delco are being discussed as possibilities for dropping, but any final decision is a long way off.

It is being seriously suggested to top GM management that the voluntary divestiture of one or two divisions could save a lot of expensive legal work. Within Congress, a number of Republicans as well as Democrats look favorably upon these proposals for a "voluntary" reduction in the size.

Says one government antitrust expert:

"We are firmly convinced that the auto industry won't remain competitive much longer if something isn't done to slow up the dominance of Ford and GM."

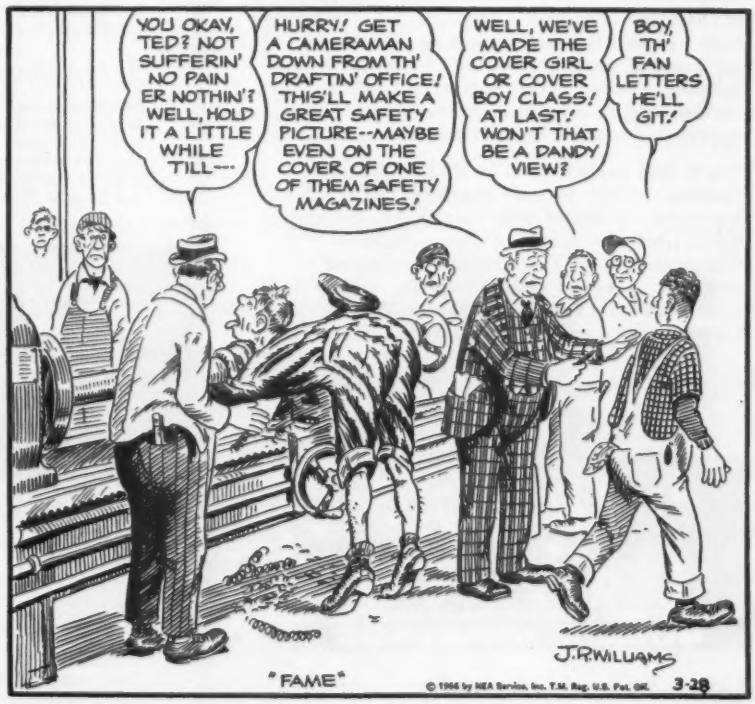
Mercury Grows West

Construction has started on a new Mercury assembly plant in California. Ground for the installation was broken last week.

The new plant is situated near Los Angeles and will be the main source of Mercury's supply for seven western states.

Mercury sales on the west coast have increased 280 pct in the last 8 years. The present assembly plant, also near Los Angeles, is not adequate for expansion.

THE BULL OF THE WOODS — By J. R. Williams


YOU OKAY, TED? NOT SUFFERIN' NO PAIN ER NOTHIN'? WELL, HOLD IT A LITTLE WHILE TILL---
HURRY! GET A CAMERAMAN DOWN FROM TH' DRAFTIN' OFFICE! THIS'LL MAKE A GREAT SAFETY PICTURE--MAYBE EVEN ON THE COVER OF ONE OF THEM SAFETY MAGAZINES!
WELL, WE'VE MADE THE COVER GIRL OR COVER BOY CLASS! AT LAST! WON'T THAT BE A DANDY VIEW?
BOY, TH' FAN LETTERS HE'LL GIT!
J.R.WILLIAMS
"FAME"
© 1956 by NEA Service, Inc. T.M. Reg. U.S. Pat. Off.
3-28

ONE OF A SERIES . . .

What makes a cylindrical roller bearing good?

SUPERIOR QUALITY of INNER RACES

The function of an inner race is to provide a fatigue-resistant surface between a shaft and the bearing rollers. Because of roller bearing geometry, there is a smaller area of contact between inner race and rollers than between outer race and rollers. This concentrates more load on the inner race and makes it the critical member from a fatigue life standpoint, particularly when the inner race is the stationary member and maximum load is repeatedly applied at one point.

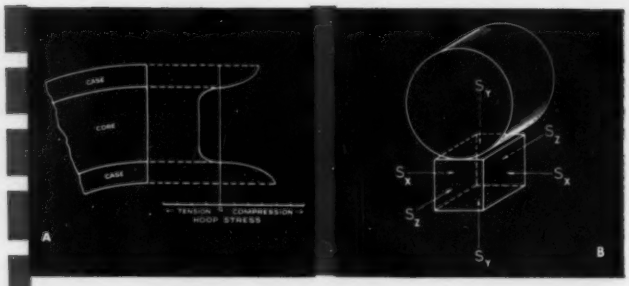
Since it is vital to good performance that the inner race does not work loose on the shaft, HYATT inner races are designed for relatively heavy press fits, so the inner race becomes an integral part of the shaft for all practical purposes. Other advantages of HYATT'S carburizing process and precision finishing operations are briefly explained at right.

You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your design requirements. Remember, HYATT is America's *first* and *foremost* maker of roller bearings. Hyatt Bearings Division of General Motors Corporation, Harrison, New Jersey.

GM GENERAL MOTORS

HYATT

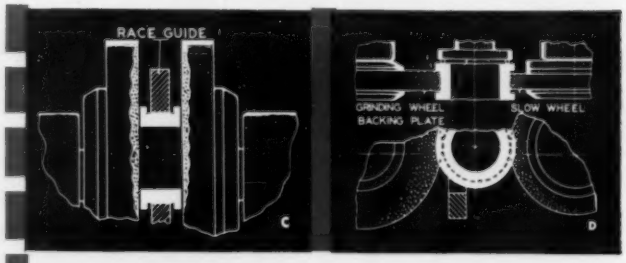
ROLLER BEARINGS



1. WHY CARBURIZING?

Carburizing provides inner races with tough cores, and flanges that will not crack, with no loss of case hardness. This permits tight press fits and also improves load-carrying capacity as shown in Diagram A. During quenching, a volumetric change tends to stretch the core and compress the case. Due to the Poisson effect, the compressive hoop stresses in the external fibres build up the load-carrying capacity.

Diagram B shows a typical element under roller load. Stresses in the "Z" direction are negligible; those in the "X" direction are compressive hoop stresses or pre-load. Those in the "Y" direction are compressive stresses due to the load. Without the compressive stress Sx (hoop stress) the load capacity would be reduced; and if "X" were a tensile stress due to pressing a through-hardened race on a shaft, the bearing capacity would be still less.

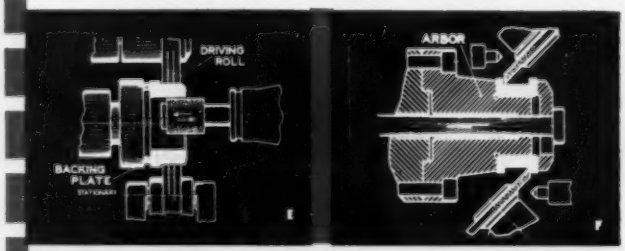


2. DOUBLE END GRIND

In grinding a HYATT inner race, the ends are first faced off square and parallel so they can be used as accurate reference during subsequent operations. The HYATT double end grind process (Diagram C) insures excellent control of parallelism.

3. CENTERLESS PATHWAY GRIND

Centerless grinding was pioneered by HYATT years ago, and eliminates excessive wall variation due to spindle and chucking errors. This method produces as nearly a perfect cylinder as is commercially practical. Two-point and three-point out of round and taper are held to a minimum. Note how work is rotated with backing plate against previously ground end (Diagram D) to insure accuracy.



4. CHUCKLESS BORE GRIND

Here the centerless method assures a bore concentric with the pathway, with minimum wall variation, by removing stock from high spots as they pass between drive roll and related grinding wheel (Diagram E).

5. FLANGE GRINDING

To assure that they will run true with roller pathway, flange faces are also ground using the squared ends for reference (Diagram F). This establishes even contact with roller ends during bearing operation.

Who'll Volunteer for Outer Space?

Outer space moon is not too far off . . . Outbound trip would be harsh on space volunteers . . . Getting back a bigger problem . . . Outposts would serve as observation posts for missiles if and when—By G. H. Baker.

◆ DEFENSE DEPT. is talking about erecting a "moon" in outer space. In this era of lightning-fast guided missiles, the military experts want to set up one or more moons as observation posts from which we locate exactly the strategic areas that could be missile targets.

Here's how the moons will be installed:

Each moon will be shot into space by a three-stage rocket. Third stage will be winged, so it can later glide back to earth.

Tough On Crew . . . During the trip, the crew members will weigh nine times their normal weight, due to extreme acceleration. Military experts say this will be a "harsh" experience, but it is one they are now learning about through experiments on the ground.

About 1075 miles from earth, men can get out of the rocket ship into the vacuum of outer space. Working inside "coke bottle" suits, they can operate mechanical arms to assemble space stations.

Each space station will be prefabricated, wheel-shaped and spinning, and will supply its own gravity.

Inside the space station, there will be room for instruments to measure the effects of vacuum, of cosmic radiation, and of the flora, fauna, and zoological life of outer space.

The space station will be protected from meteors by thin steel or dural.

How To Get Back . . . How are they gonna get back? This is a "formidable" problem, the military experts say.

The ship will re-enter earth's atmosphere at 18,000 mph, and must be slowed down by propellants so that it will hit the earth at no more than 60 mph. On approaching the landing strip, the ship will run out tricycle landing gear and will land like a conventional airplane.

Procurements contracts are not being let just yet, but don't laugh. The Defense Dept. probably will call for bids in another year or two.

Urge Anti-Bias

The Eisenhower Administration is urging working youths of minority groups to pursue technical and scientific careers.

And it urges employers to admit without hesitation all qualified members of minority groups seeking technical job training.

Members of President Eisenhower's Committee on Government Contracts say in a new report to the White House that young persons of minority groups should seek training in the vocations for which they have aptitude on the same basis as others.

The Committee is urging management and labor leaders to provide equality among all persons seeking employment.

The anti-bias program was put into effect by Mr. Eisenhower in August, 1953, for the purpose of promoting racial and religious equality in firms holding government contracts.

Atomic Advantages

Because atomic-powered ships need neither boiler uptakes nor

Army, Air Force Demand "Satisfaction"

Senate Armed Services subcommittee proposes duel between long-range antiaircraft guided missiles at fantastic range.

THE WEAPONS—Army's NIKE against Air Force's TALOS.

BACKGROUND—Army wants funds to expand Nike defense while Air Force wants funds to establish Talos defenses around its Strategic Air Command.

THE SLAP—Army says it has jurisdiction in continental defense. Air Force says Talos is better.

RESULTS—Probably secret anyway. Data on both is still restricted.

AL CHROMIUM-MANGANESE *LOW-NICKEL* STAINLESS GRADES

Here is a direct answer to the recurring problem of nickel shortage. For many users of chromium-nickel austenitic stainless steels, the new AISI 200-series of chromium-manganese low-nickel austenitic grades can be a source of immediate relief—and an avenue to the reduction and possible avoidance of nickel shortage problems in the future.

In many cases, you can switch directly from the older Type 301 and 302 grades to the new AL Stainless Type 201 and 202 steels, using the same fabricating processes and securing about the same results. There's nothing new to learn, and no loss in performance in practically all applications. In certain respects, these steels have better properties than the older materials and may be used to actual advantage in some cases.

We also produce low carbon grades of these chrome-manganese steels, arbitrarily designated Types 204 and 204L (similar to the older grades 304 and 304L) . . . as well as a lower-chromium, higher-manganese grade designated Type CM, which contains only 1% nickel. Allegheny Ludlum has pioneered in the development and application of these low-nickel stainless steels. We know what the new grades will do . . . let us help you put them to use. ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.***

WRITE FOR THE ASSISTANCE YOU NEED

1. "TECHNICAL STUDIES #3"

. . . essential information on the composition, properties, fabricating methods and applications of AL chromium-manganese, low-nickel stainless steels. *Write for your copy.*

2. TEST SAMPLES

. . . We'll be glad to supply engineering assistance, and actual samples of these 200-Series steels for testing under your processes and conditions.

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Allegheny Ludlum

AL STAINLESS STEEL

WSW-5738

Warehouse stocks carried by all Ryerson Steel plants

smokestacks, the Navy (and later, private ship owners) will have much more deck-space and cargo-space available.

As far as the Navy is concerned, this spells added space for the mechanism that fires guided missiles. On carriers, it means additional space for more planes. On freighters, more revenue space for cargo. In other words, nuclear-powered ships are designed primarily around their power plants and the weapons they carry, rather than around their fuel-carrying capacity, as is the case with conventional ships.

An atom-powered, missile-carrying cruiser will soon be built, and an atom-powered aircraft carrier in on the drawing boards and will be built in 1957 or '58.

Insured Atoms:

Reactor plants will get coverage.

Each privately-operated nuclear reactor plant may have the rates for its insurance coverage tailored to fit its special needs, a new report to the government by a special group of insurance executives indicates.

Preliminary rating standards may be set up soon, but estimates of the costs of coverage must be made first, the group tells the Atomic Energy Commission. Its report describes progress made since March, 1955, when the executives undertook to solve some of the problems of insuring industrial atomic facilities.

Pool Forces

Most difficult question for the insurers is that of the extent of third-party liability in the event of an A-plant explosion. Claims following such a catastrophe would be too high to be handled by an individual insurer, and the companies are developing insurance pools to take care of the coverage.

Stock casualty firms are forming a pool with a total capacity of $50 million worth of coverage. Mutual companies are starting a pool with a capacity of not less than $15 million. Where the full stock and mutual capacities are used at any one nuclear plant, a liability of at least $65 million could be handled. Pool arrangements are also being made to cover physical damage to the plant property.

Delaware:

Funds on the way to deepen channel.

Congress this year will probably approve funds to begin work on the long-delayed Delaware River deepening project from Philadelphia to Trenton. Opposition which has held back the project for several years appears to have melted.

If the project is approved, a raft of firms with options on land adjoining the upper Delaware are expected to start construction of industrial plants.

Provisions

A bill now before Congress would provide $100,000 toward a 30-year engineering survey to determine details of flood control and navigational work on the 30-mile stretch of the river. Total cost of the project is about $90 million. Congress is being asked this year for $6 million to rebuild a bridge near Philadelphia.

Eventually, proponents of the upper Delaware project want a 35 or 40-foot channel to permit ocean-going ore ships and other cargo carriers to navigate all the way up to plants along the river. U. S. Steel's Fairless Works is the major facility on upper river.

Disaster Agency

Government assistance to U. S. areas hit by natural disasters will be coordinated for the Federal Civil Defense Administration by a new Natural Disaster Office in Battle Creek, Mich.

FCDA has been concerned with 50 disasters, exclusive of droughts, in which federal money was expended, since 1953. Requests for federal reimbursement of rehabilitation costs come from state and local governments. The Natural Disaster Office will take part in the processing of these requests.

Lloyd A. Woodward, a professional engineer who served with the FCDA Region 6 office in Denver, heads the office. The staff includes three engineers, an auditor, and a disaster analyst.

Modern Day '49ers Hunt Pay Dirt

▪ Interest in the government's aid program for prospectors searching for deposits of strategic minerals and metals is picking up with the advent of spring.

Some 45 applications for financial assistance were filed with the Interior Dept.'s Defense Minerals Exploration Administration in February, the highest monthly total in almost a year. Total estimated cost of the proposed projects is $2.8 million, covering explorations for copper, fluorspar, lead, manganese, mercury, mica, tungsten, uranium and zinc.

In the same month, DMEA granted aid to eight prospectors searching for tungsten, uranium and mica. Total cost of these projects is $161,000, with the government putting up a maximum of $121,000.

To date, some 3000 applications have been received under the program; 868 have been approved and 227 have resulted in discoveries.

high scorer

. . . and in high speed steels, it's always REX

Crucible's REX® high speed steel always scores highest on performance—as it has for more than a half century. That's because it is consistently sound and uniform in structure . . . with dependable response to heat treatment.

But don't take our word for it. Check REX for yourself—by any test you choose. You'll discover that recent improvements in manufacturing techniques have made it better than ever—why REX is today, as it's always been, *the standard by which all other high speed steels are compared!*

REX is immediately available at all Crucible warehouses, or on prompt mill delivery. For a list of helpful data on REX and other *special steels*, write for a free copy of the "Crucible Publication Catalog." *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

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Aircraft Leads San Diego Growth

Expansion plans for southern California city center on growing aircraft manufacture . . . Other businesses will get greater share of goods and services . . . $10 million atomic research lab planned for area—By *R. R. Kay.*

◆ INDUSTRIAL weather forecast for San Diego and vicinity: fair and warmer for more industry, more business, more people, and more dollars. It's a sunny outlook for 1956.

The place is jumping. Population is up 43 pct since 1950—now 800,000—will be a million in 1960. Employment swelled 45 pct. Payrolls zoomed 183 pct. The population hike pushed San Diego from 28th to 19th spot in U. S. metropolitan area ratings.

Aircraft manufacture, with its 37,000 workers, dominates San Diego's economy. Expansion plans, already blue-printed, are sure to up the area's basic employment. Other industries and businesses will get lots of the cream whipped up by the booming demand for goods and services.

Aircraft Big Four . . . San Diego's "big four" in aircraft and components manufacture are Convair Div. of General Dynamics Corp., Rohr Aircraft Corp., Ryan Aeronautical Co., and Solar Aircraft Corp. They have a cool $1 billion backlog tucked away. This is good "rain insurance" for the years ahead.

And coming: A $10 million atomic research laboratory for pure and applied science. First project will be basic research aimed at developing more efficient reactor systems. General Atomic Div. of General Dynamics Corp. will build the laboratory on a 300-acre site.

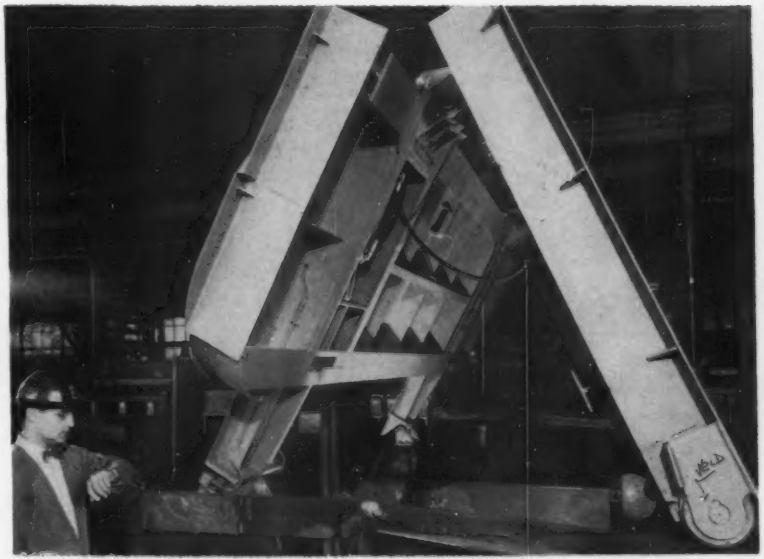
Gets a Boost . . . Shipbuilding is getting a shot in the arm. San Diego's National Steel & Shipbuilding Co. got a $2.4 million military contract for design and construction of an experimental amphibious supply ship. If the prototype works out, there'll be some healthy production orders. The 385-ft freighter, one of the largest built in the area, will carry loaded trucks and trailers in amphibious operations.

News Roundup Notes

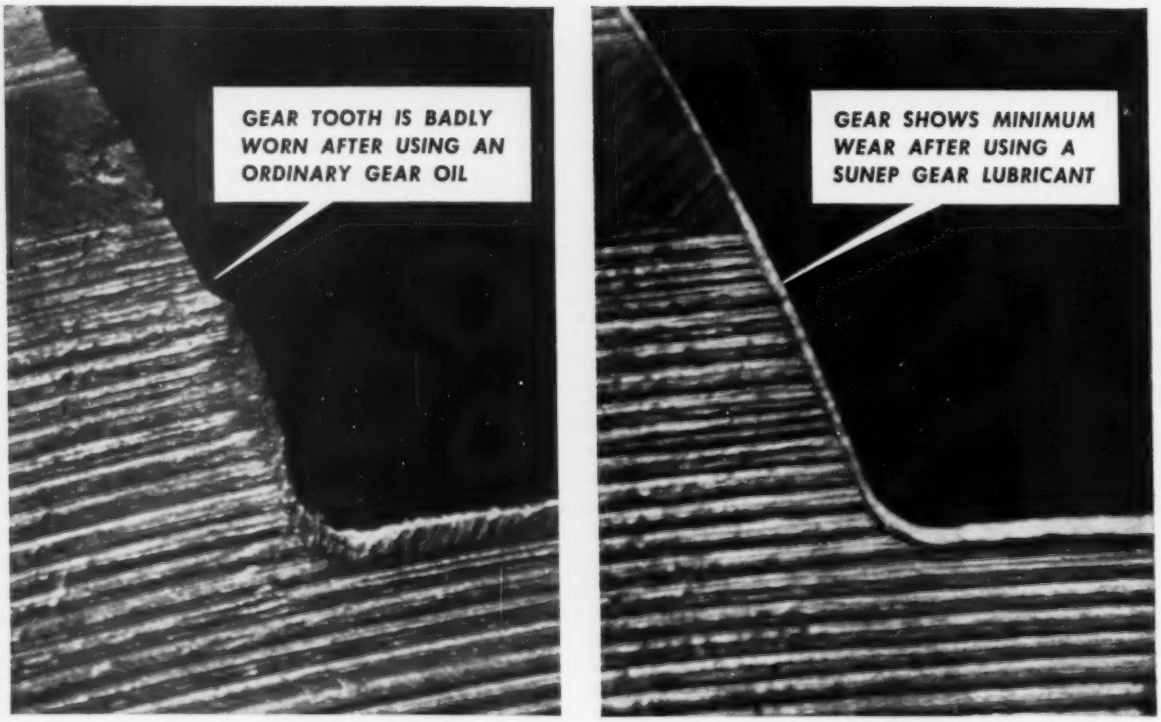
Sign of the times: a university-sponsored course on use of solar energy. The 12-lecture course, one of the country's first, starts next week at University of California at Los Angeles. Top national experts will give students the latest on solar energy availability, collection, concentration, conversion, use in photochemical processes.

New jet and propjet transports make the big news. But there is still a substantial and long-term market for conventional piston engine transports. Eastern Air Lines just bought 12 Model 440 Metropolitan transports from Convair Div. of General Dynamics Corp., San Diego. Total cost $10.5 million.

Look for Lockheed Aircraft Corp. to spend over $30 million this year on new plant facilities and equipment, part of $100 million program. And the company is now negotiating for some $200 million in military orders.



SIXTEEN hydraulically-operated hatch covers are being "tailor-made" at Bethlehem Pacific's Shipbuilding Div. for two vessels now being converted to passenger ships. Cover is tested here on mockup hatch in shop test.



COMPARATIVE TESTS on identical new worm gears demonstrate superiority of Sunep Gear Lubricant. Gear on left, using a compounded cylinder oil, shows excessive wear at 70 hours. Gear on right, protected by Sunep, shows minimum wear after running over 200 hours!

HERE'S PROOF SUNEP GEAR LUBRICANTS MINIMIZE WEAR

Sunep Gear Lubricants cut power losses...protect against overloads ...lengthen gear life...reduce maintenance costs and replacements.

During recent tests gear units protected by Sunep Gear Lubricant showed an absolute minimum of wear when run at normal rated capacity. There was no indication of scoring or wear even when run at overloads up to 118%! Power consumption was reduced up to 25%. Damage from shock loads was nil.

In addition to outstanding load-carrying ability, Sunep Gear Lubricants are extremely stable, non-corrosive, prevent rusting, keep gears and bearings clean.

For complete information about how Sunep Gear Lubricants can help give longer life to your worm gear units, see your Sun representative...or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-3.

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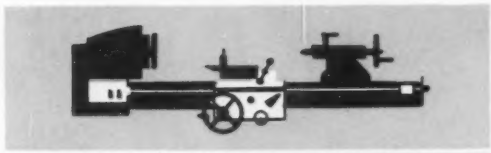


MACHINE TOOL HIGH SPOTS

M-Day Tool Pool Plan Hits High Gear

Office of Defense Mobilization sets aside $21 million to back up official tool order program . . . Plan resembles Korean emergency guarantee-to-purchase blueprint. . . Metal cutting tool orders dip—*By E. J. Egan, Jr.*

◆ WHEN AND IF the nation mobilizes for full defense, builders of general purpose machine tools can go into three shift production with full payment for their output guaranteed by the government.

Office of Defense Mobilization last week set aside $21 million to back up an official "M" Day machine tool pool order program. The plan will insure maximum production of general purpose equipment for the first 6 mos following any future M-Day. It will eliminate the usual time lag between the placement of defense contracts for end items and the contracts for machine tools to make the end items.

Funds for the pool order program are earmarked under the Defense Production Act Borrowing Authority. No advances or expenditures will be made until the program is triggered by government notice to machine tool builders to "get going." At that time, however, working capital advances can be obtained if builders need them, up to 30 pct of the value of the machines to be built.

How It Works . . . Actual pool order contracts will be placed with builders by the General Services Administration during the next few months. First, however, a list of tools to be included in the program must be prepared by the Business & Defense Services Administration of the Dept. of Commerce. Work on this list is already underway. When it is complete, ODM will review it. The final approved roster of machine tool types will be sent to GSA.

What You Can Do . . . Builders wishing to participate in the pool order program should communicate with the metalworking equipment division of BDSA.

The list of machine tools covered by these pool orders will be reviewed every 6 mos. Changes will be made in accordance with mobilization plans.

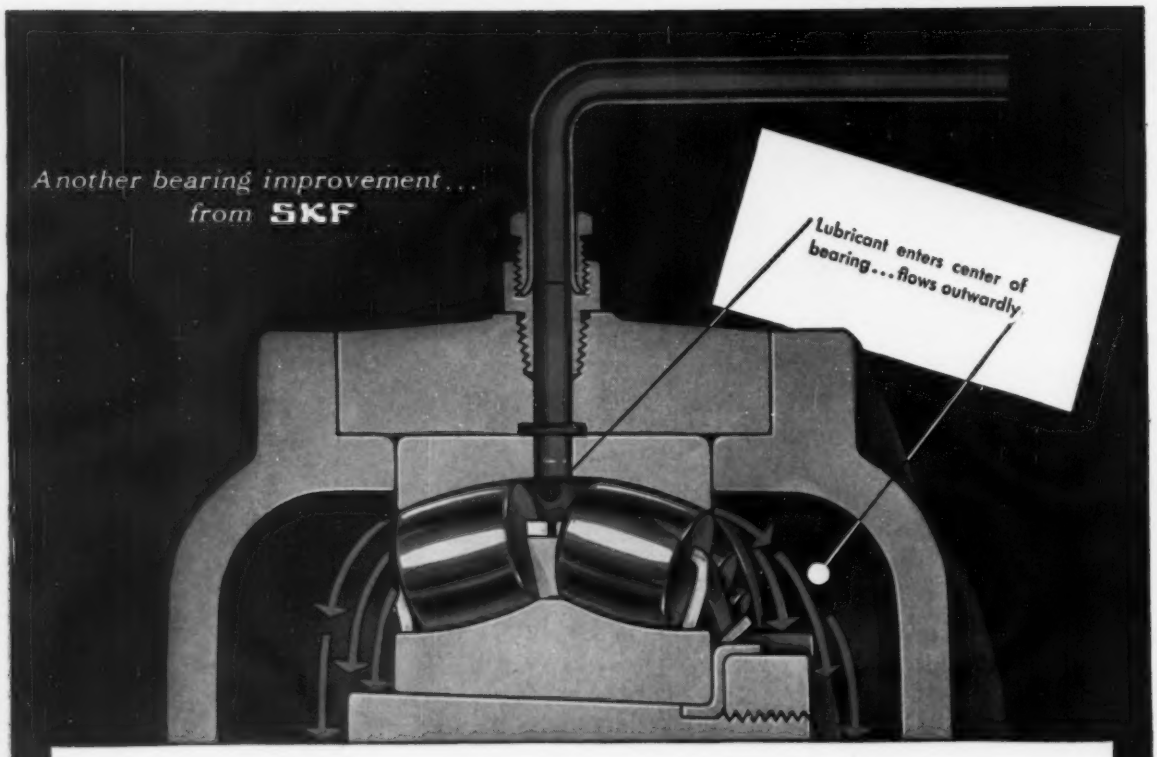
A similar government-guarantee - to - purchase program was adopted during the Korean emergency. It enabled builders to produce 87,000 machine tools, output of which otherwise would have been delayed until firm contracts were issued.

Need Usable Guide

Top management in many metalworking plants is apparently unconcerned about or possibly unaware of, the relative inefficiency of the overaged or otherwise obsolete machine tools that production departments are forced to use. Members of the American Machine Tool Distributors Assn. launched a vigorous attack on this problem at their spring meeting.

Members of a panel discussing "selling the replacement market" generally agreed that some form of replacement formula is an excellent guide to correct buying.

NEW officers of the ASTE: seated l. to r., 3rd vice president Wayne Ewing, president Howard C. McMillen, 1st vice president Harold E. Collins, 2nd vice president George A. Goodwin. Standing l. to r., past president Dr. Harry B. Osborn, secretary William Moreland, 4th vice president H. Dale Long. Not shown, treasurer John X. Ryneska.



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SKF's improved method of lubricating large spherical roller bearings

To make the lubricant effective it should be located where needed—in the bearing. Also, new lubricant, when added, should enter where it does the most good—in the bearing.

For these reasons, all future production of SKF double row spherical roller bearings above 240 mm O.D. (9.4488") will be made with three equally spaced drilled holes in the center of the outer ring without any extra charge to our customers. *This permits the lubricant to enter the center of the bearing.*

With the lubricant (either grease or oil) being introduced into the center of the bearing, all working surfaces are quickly and completely covered. In addition, the outward flow flushes out the old lubricant, and with it, any abrasive dust, dirt, moisture or other impurities.

And where circulating oil lubrication is required, there is a continuous flushing and cooling of the bearing.

This is another example of how SKF helps you to obtain longer bearing life.

7706

Consult your SKF District Office today for complete information so that you can be the first to incorporate into your products this improved method of lubricating large spherical roller bearings.

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BALL AND ROLLER BEARINGS

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

—manufacturers of SKF and HESS-BRIGHT® bearings.

The Iron Age

SALUTES

Allen K. Heydrick As director of education and training for National Steel, he's an expert on advising people how to get along with one another. It's a challenge he always meets head on, gets results.

Management people at National Steel Corp. have as clear an understanding of the company's labor contracts as union leaders themselves. This not only includes management directly concerned with negotiation of labor contracts, but management at all levels.

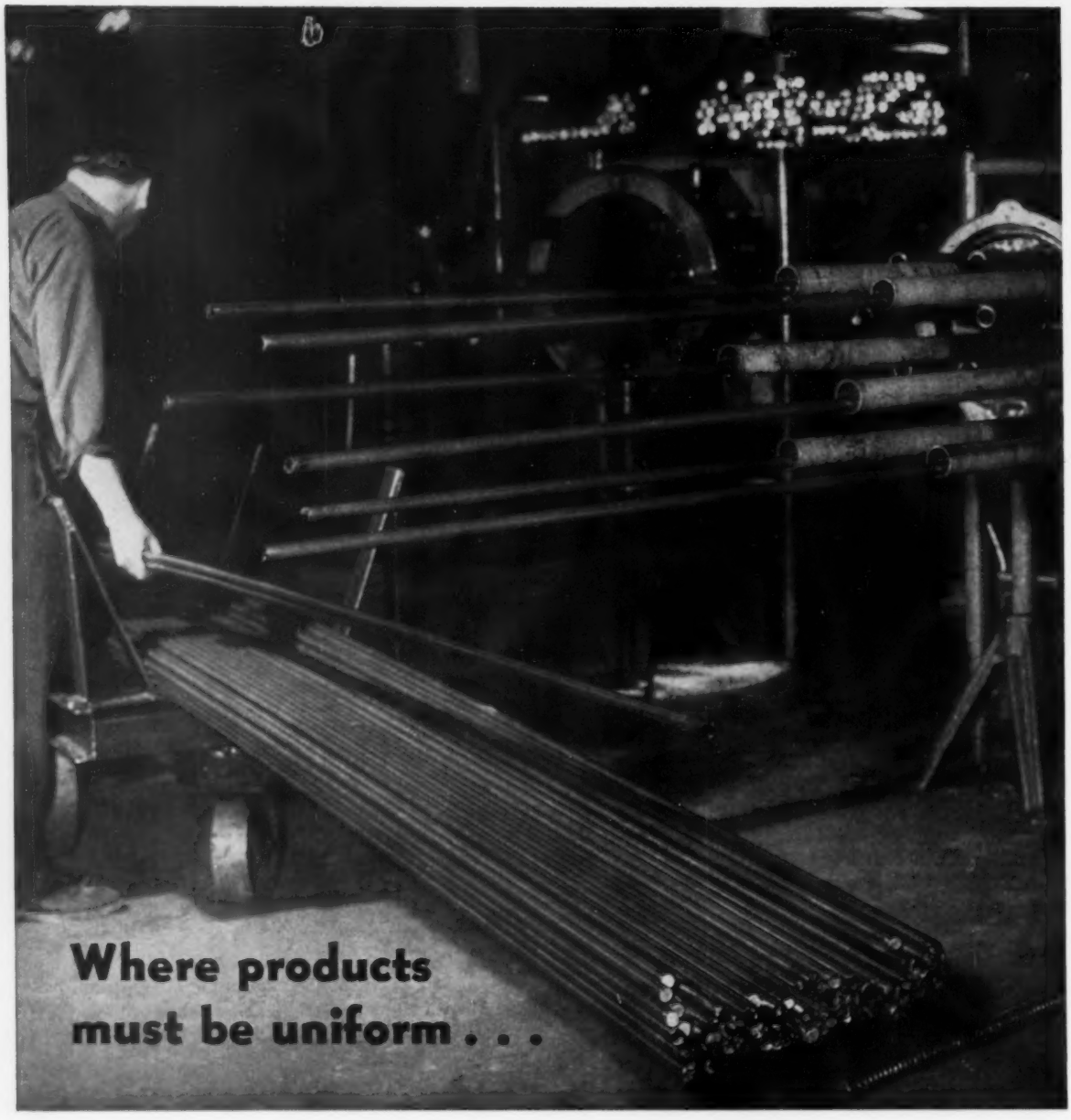
Largely responsible for this desirable state of affairs is Allen K. Heydrick, director of education and training for National Steel, who has come a long way with the company since he joined its Weirton Steel Div. in 1952.

In affiliation with the Labor Relations Center of the University of Chicago, Al Heydrick developed the training programs of HOLCO (How Our Labor Contract Operates) and Human Relations in Action. Both programs have attracted deserved attention in industry generally.

An affable, soft-spoken man well-suited to the job of advising people how to get along with one another, Mr. Heydrick has never been one to look the other way when a big challenge came along. His whole background has been in the field of education and human and public relations.

National Steel's education and training program is conducted for supervision and management. It is based on the conference method with each annual program consisting of from nine to 12 sessions. Members of supervision and management participate in the program in groups of from 16 to 20.

A graduate of Lock Haven (Pa.) State Teachers College, Mr. Heydrick also took special training at Northwestern University and Pennsylvania State College. Following his discharge from the Navy with rank of lieutenant after World War II, he was engaged in special public relations activities with the Navy Dept. in Washington.



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●It takes steel bars of uniform quality to turn out uniform products. That's why so many shops prefer Youngstown Cold Finished Carbon, Yolead and Alloy Steel Bars.

With Youngstown, uniformity starts in the Bessemer or Open Hearth. It is maintained throughout manufacture by men trained to work to exact specifications, checked at every step by close inspection. The name Youngstown is your best assurance of uniformity in screw machine stock.

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The Iron Age INTRODUCES

John S. Coleman, president of Burroughs Corp., Detroit, elected president, **Chamber of Commerce of the U. S.,** Washington.

James J. Munns, elected executive vice president, **National Steel Corp.,** Pittsburgh; **Daniel H. Dellinger,** elected assistant vice president, quality control.

Mark E. Eastin, Jr., elected president, **West Kentucky Coal Co.,** Madisonville, Ky.

Joseph Rosecky, elected vice president, **The Baldwin-Lima-Hamilton Corp.,** Eddystone, Pa.

Robert M. Pfaff, elected vice president and assistant general manager, **Conveyor Systems, Inc.,** Chicago.

Ralph P. Zollinger, appointed controller, Vulcan Crucible Steel Div., **H. K. Porter Co., Inc.,** Aliquippa, Pa.

E. N. Rhodes, Jr., elected vice president and Indianapolis district manager, **Hubbell Metals Inc.,** Indianapolis.

Park Q. Wray, Jr., named vice president, sales, **National Motor Bearing Co., Inc.,** Redwood City, Calif.

Thomas J. Behan, appointed assistant manager, Buffalo sales branch, **Crucible Steel Co. of America,** Pittsburgh; **Kenneth M. Acton,** appointed assistant manager, San Francisco sales branch.

Fred W. Lee, appointed district manager, Connecticut, **Bay State Abrasive Products Co.,** Westboro, Mass.

Loren Gillhouse, appointed sales manager, **Quincy Compressor Co.,** Quincy, Ill.

Edward Renz, appointed sales representative, Chicago, Alloy Metal Wire Div., **H. K. Porter Co., Inc.,** Prospect Park, Pa.

Herbert M. Lundstrom, appointed service engineer, **Mallory-Sharon Titanium Corp.,** Niles, O.; **Leland W. Long,** appointed sales engineer, commercial market development, titanium mill products.

R. K. Hendricks, appointed area sales representative, Des Moines, **Interstate Steel Co.,** Evanston, Ill.

Paul G. Bach and **Foster Callagahen,** named to field sales staff, **E. H. Titchener & Co.,** Binghamton, N. Y.

Gerald S. Clooney, named sales representative, St. Louis, Chemical Industrial and Aircraft Sales Dept., **Wyandotte Chemicals Corp.,** Wyandotte, Mich.; **Andrew J. Lutz,** named sales representative, Kansas City.

William M. Adams, appointed news editor, Press Information Service, **Chrysler Corp.,** Detroit; **William P. Stempien,** named manager, Press Information Service.

ROLAND LEHR, elected president and general manager, Baker Bros., Inc., Toledo, O.

HERBERT I. SEGAL, elected president, Van Norman Industries, Inc., Springfield, Mass.

STEPHEN L. INGERSOLL, elected president and general manager, Ingersoll Steel Div., Borg-Warner Corp., New Castle, Ind.

JAMES M. PHILLIPS, elected vice president, engineering, Salem-Brosius, Inc., Pittsburgh.

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selects
H&K MORESQUE PATTERN
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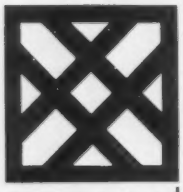

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TITLE_____
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STREET_____
CITY_____ ZONE_____ STATE_____

Samuel S. Whiteley, Jr., appointed assistant sales manager, **Hunter Spring Co.**, Lansdale, Pa.

Robert B. Connell, appointed manager, sales, central district, **Titanium Metals Corp. of America**, Chicago.

Edgar H. Woods, appointed general sales manager, Tractor and Implement Div., **Ford Motor Co.**, Birmingham, Mich.

E. A. Nash, manager, appliance distribution development, **Servel, Inc.**, Evansville, Ind.; **Robert B. Robinson**, named special assistant to vice president, home appliance sales; **Joe C. Turner**, named marketing research manager; **John F. Lateulere**, named manager, sales analysis and control.

George White, named general manager, Atomic Power Equipment Dept., **General Electric Co.**, Schenectady; **Admiral Willard A. Kitts 3rd**, appointed manager, planning study, Atomic Power Equipment Dept.

Harold E. Moon, appointed manager, Cincinnati, sales and service, The Yale Materials Handling Div., **The Yale & Towne Manufacturing Co.**, Philadelphia; **J. Russell Manning**, appointed manager, Yale branch, Detroit.

Charles Tremitiere, named Eastern division replacement sales manager, **National Bearing Co., Inc.**, Van Wert, O.

Following appointments were announced by the Allis-Chalmers Industries Group. **Richard K. Sexton** and **Evan F. Reynolds, Jr.**, named sales representatives, Kansas City district office; **S. C. Vaccarella**, named sales representative, general purpose equipment, Los Angeles; **Harvey D. Hill**, named sales representative, Cleveland district; **James H. Stoltz**, named sales representative, Pittsburgh office; **Robert W. Venn**, named sales representative, Chicago.

AUSTIN KUHNS, elected senior vice president, Farrel-Birmingham Co., Inc., Ansonia, Conn.

DR. DILLON EVERS, appointed associate director, research, Mallory-Sharon Titanium Corp., Niles, Ohio.

GEORGE W. BLACKMORE, named general manager, Materials Handling Div., Heppenstall Co., New Brighton, Pa.

JACK A. HEATH, named field engineer, West Coast district office, Norton Co., Los Angeles.

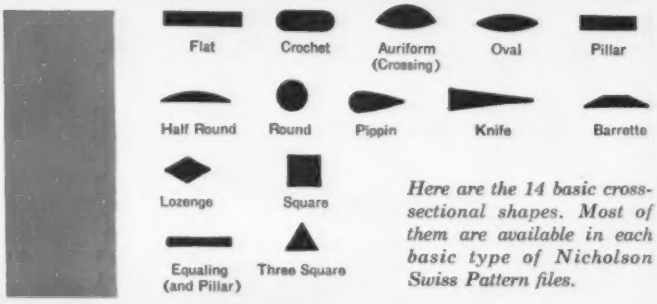
PRECISION FILES FOR PRECISION WORK...

THE STORY OF TRADE X.F. MARK TRADE X.F. MARK

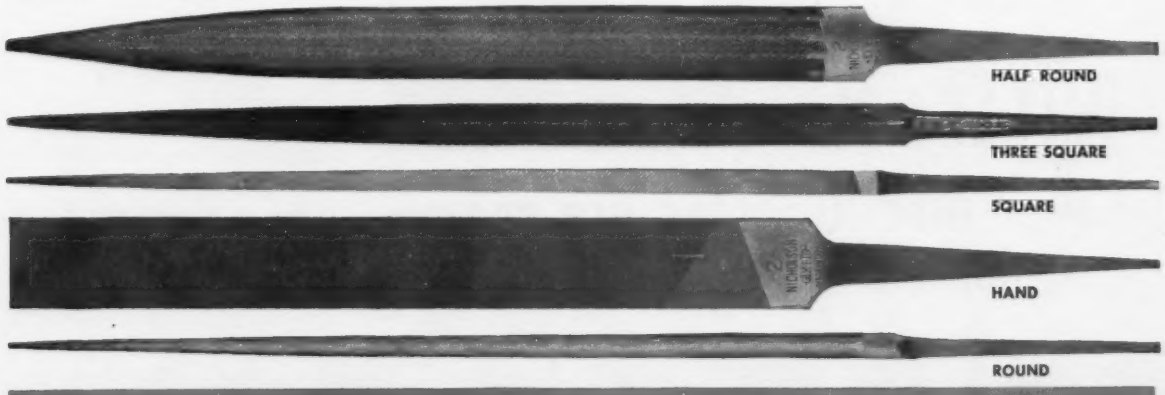
NICHOLSON X.F. SWISS PATTERN FILES

There are hundreds of types and sizes in the Nicholson's Swiss Pattern "family." You'll find Nicholson X.F. (*EX*tra *F*ine) files especially developed for precision work and fine finishing in your shop—everything from jewelry through die making to aircraft.

Nicholson Swiss Pattern files are made to extremely exacting standards. Many of these files have the same general shapes as American Pattern files, but are thinner and more finely shaped. They come in a greater variety of shapes and sizes, and are available in *six* degrees of fineness, instead of the three found in conventional American Pattern files.



Here are the 14 basic cross-sectional shapes. Most of them are available in each basic type of Nicholson Swiss Pattern files.



Above are representative files from the most popular group of Nicholson Swiss Patterns. Others include Knife, Round Straight, Metal Saw, Pillar, Equaling, Pippin, Ring, Warding, Barrette, Slitting and Crossing.

Another important group is Round (knurled) Handle Swiss Patterns. These are available in most of the basic cross sections, either individually or boxed in assortments of one dozen.

Nicholson also manufactures Special Purpose Swiss Patterns of the following types: Parallel Machine files, Special Tension Machine files, Round Bench Machine files, Square Handle Needle files, Die Sinkers and Silversmiths Rifflers. These files are available in most of the basic cross sections.

This is the simplified story of Nicholson Swiss Pattern files. Your Industrial Salesman will gladly tell you more about how Nicholson Swiss Patterns can increase filing efficiency in your shop.

Write for free book: "FILE FILOSOPHY"

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(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario) BLACK DIAMOND U.S.A.

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Kover-Mor® Goggles designed for chippers are fitted with Willson *Super-Tough* lenses heat treated for greater impact resistance. Note how 4 screened eye cup ports admit air to keep lenses fog-free.

WILLSON

Kover-Mor® Goggles are roomy

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PERSONNEL

Dr. Edward R. Weidlein, chairman of the board of trustees and president of the **Mellon Institute,** Pittsburgh, will retire March 31. He will remain on the board of trustees and will act in advisory capacity in Institute research programs.

Dan W. Oram, elected executive director, sales, **Klemp Metal Grating Corp.,** Chicago.

F. B. Tannehill, named chief industrial engineer, **Axelson Manufacturing Co.,** Los Angeles.

E. G. Crouser, appointed chief production engineer, Wheeling Factory, **Wheeling Steel Corp.,** Wheeling, W. Va.

W. E. Brainard, named chief engineer, Aircraft Machine Tool Div., **Kearney & Trecker Corp.,** Milwaukee.

James E. Drylie, appointed eastern sales representative, Philadelphia, **Thomas Machine Manufacturing Co.,** Pittsburgh.

James E. Patas, appointed director, merchandising, **Charles Bruning Co., Inc.,** Chicago.

James L. Everett, named assistant to general manager, Engineering Works Div., **Dravo Corp.,** Pittsburgh.

Walter C. Stone, named field engineer, Pittsburgh district office, **SKF Industries, Inc.,** Philadelphia.

OBITUARIES

Fred E. Leeming, district sales manager, **Superior Steel Corp.,** Los Angeles territory.

T. E. Woodruff, manager, Pump Sales Div., **Fairbanks, Morse & Co.,** Chicago.

Alonzo Galloway Decker, 72, chairman of the board, president, one of the founders of **The Black & Decker Mfg. Co.,** Towson, Md.

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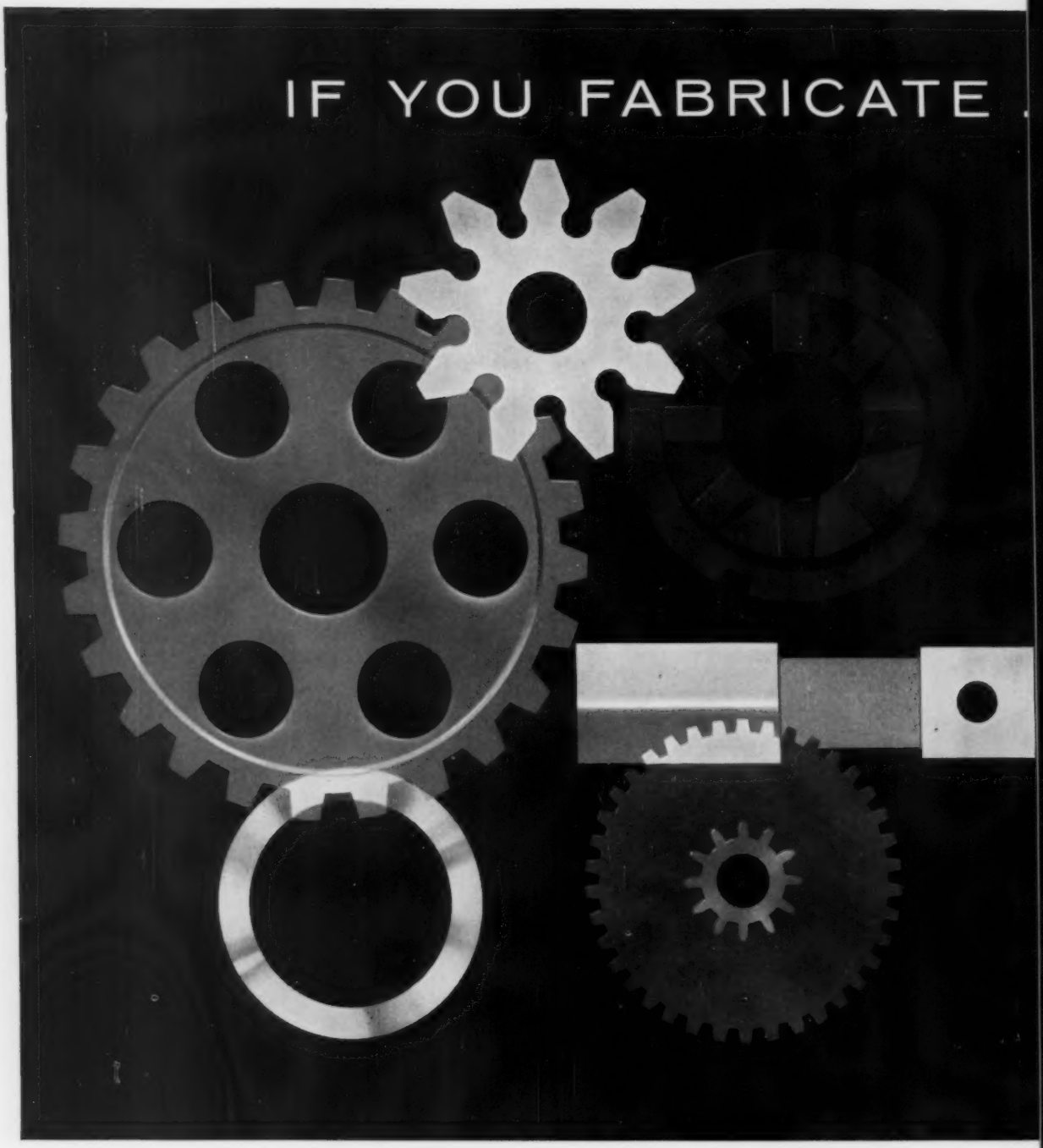
They are in such demand that GRAY is the largest planer builder, further proof that *Quality doesn't cost . . . it pays.*

The G. A. GRAY Co., Cincinnati, Ohio



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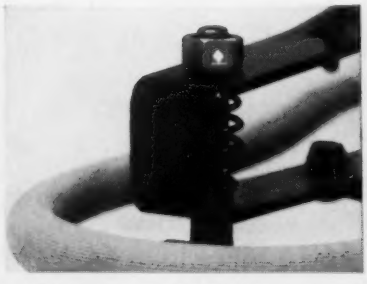
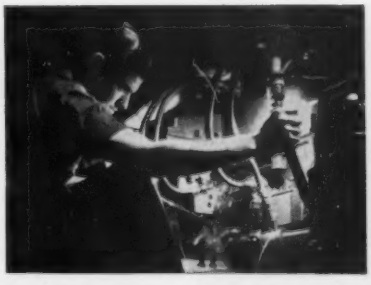
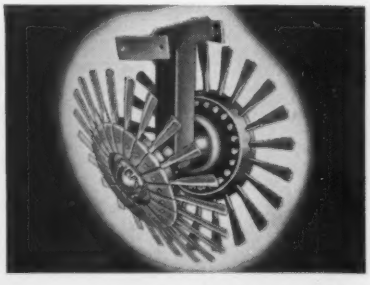


AN OPPORTUNITY TO SPEED ASSEMBLIES is provided by Republic "Nylok"* Nuts. These one-piece, cold-forged nuts go on fast from either end. There's no fumbling to find the right side. No special tools are needed. Feed them manually or mechanically. They provide positive locking even under severe shock, vibration and tension. Make your own test. Write for a sample "Nylok" Nut, indicating size required.

*U. S. Pat. No. 2,450,694 and pending applications.



AN OPPORTUNITY TO TURN OUT MORE on your automatics is only one reason for switching to Republic Cold Finished Steel Bars. They give your steel parts higher strength, greater hardness, a bright, smooth finish and provide top ratings on feeds and speeds, long tool life, freedom from abrasion, improved surface finish and high product quality. Available in all carbon, alloy and stainless analyses.



AN OPPORTUNITY TO DESIGN SMALLER SECTIONS to carry heavier loads with no sacrifice in strength or safety is made possible by Republic Alloy Steels. They permit the beet digger tines illustrated, to be made thin enough to penetrate hard ground. Yet they are 24% stronger than those made from carbon steel. Republic Alloy Steels resist fatigue, shock, stress and respond uniformly to heat treatment.

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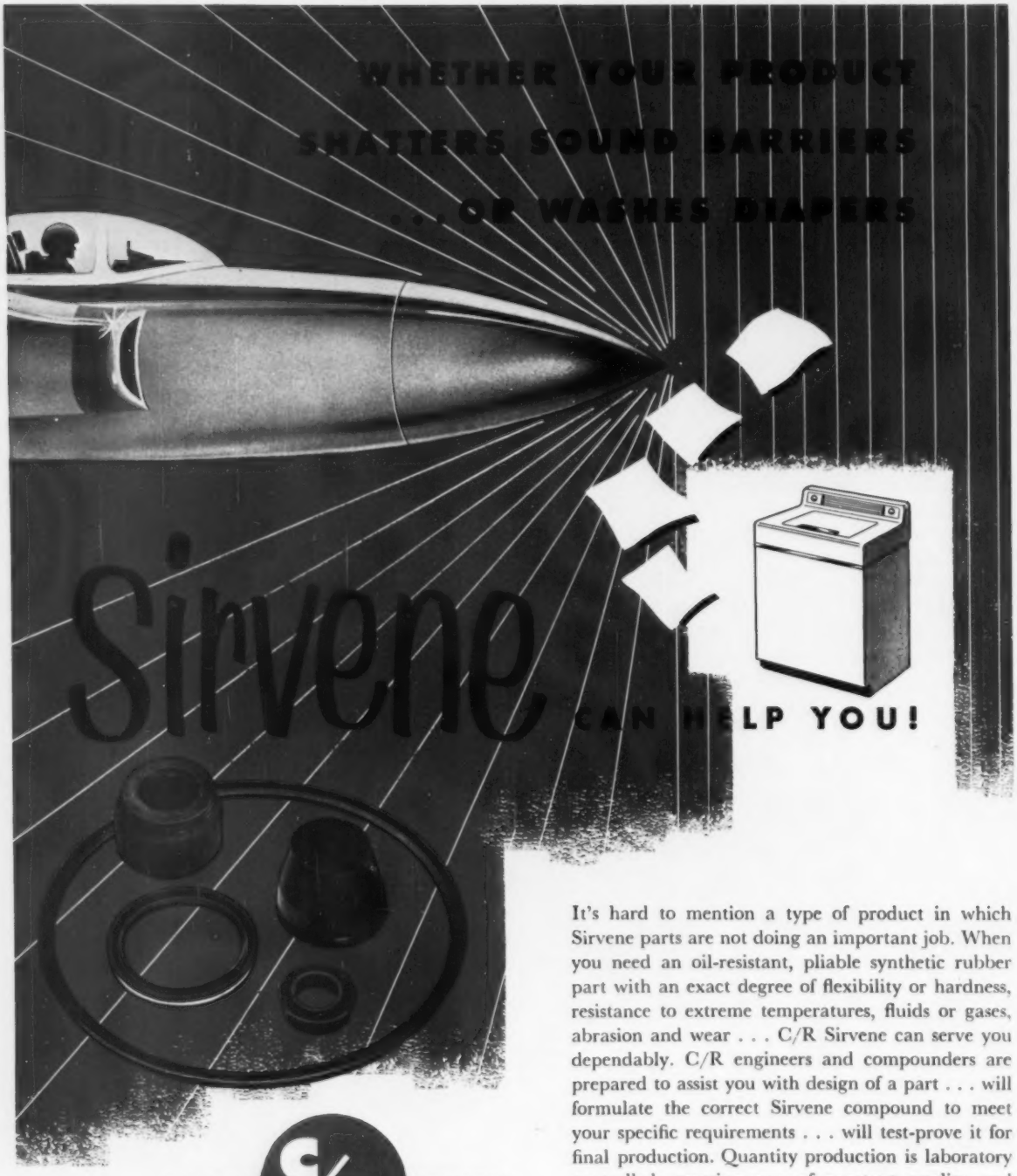

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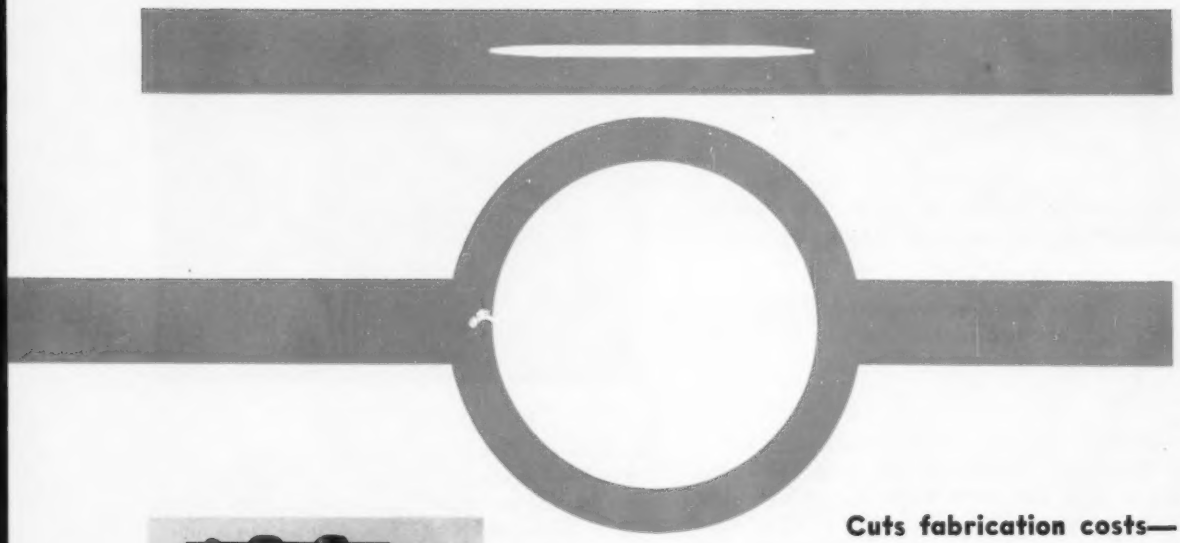
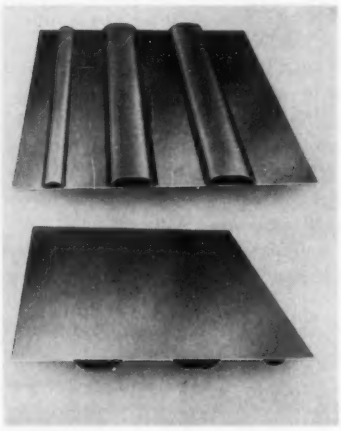
Export Sales: Geon International Corp. Great Neck, New York.

FEATURE ARTICLES





Cuts fabrication costs—

Tube-In-Strip: Bonanza for Product Designers

◆ In coil form, it *looks* like an ordinary mill product . . . The difference: for the first time hollow tubing and metal strip are combined in a single sheet of either copper, brass, or aluminum.

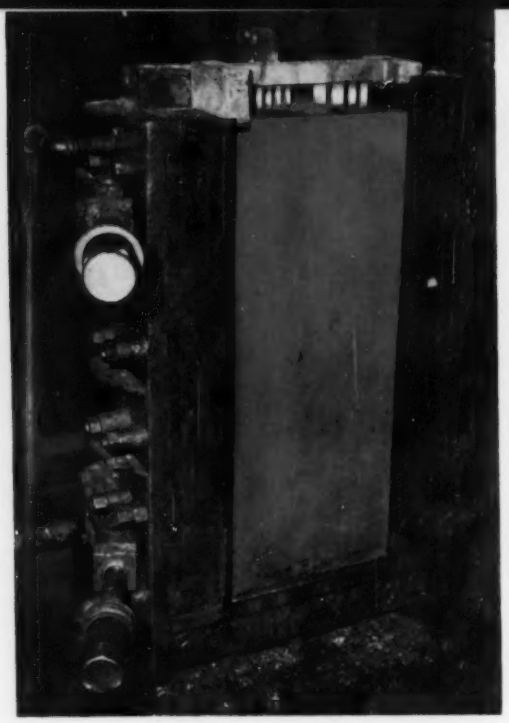
◆ Priced to attract the largest market, the new mill product can be readily stamped or drawn to fit your application . . . Ends and other surfaces are a cinch to braze or weld.

By P. M. UNTERWEISER, Metallurgical Editor

◆ AS TRADE NAMES GO, Tube-In-Strip certainly suits its product. For Tube-In-Strip (the product) combines hollow tubing and metal strip in a single sheet of either copper, brass, or aluminum. No bonding, brazing, or welding is involved because the new product incorporates both tube and strip in the original casting from which the strip is rolled.

Simple as the safety-pin and just about as fundamental, Tube-In-Strip is the kind of development that makes you wonder why *you* hadn't thought of it first. If you had, you'd be in the fortunate position of its developers and exclusive producers—Revere Copper and Brass Inc. You could also lay claim to what is conservatively estimated to be one of the most important new

Above: When desired, use of die or restraining plate will allow inflation of half tube section only.



Right: Copper "cake" with accurately located "resist" rods is cast in a conventional book mold. This "cake" weighs approximately 800 lb.

material developments of the present century.

When you order T-I-S, you'll receive either coil or sheet that, at first glance, resembles the ordinary mill product. But try bending a sample end, and you'll notice the big difference. At the point of bending, the outline of the flattened tube sections becomes immediately evident.

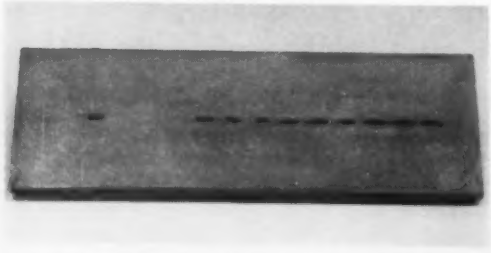
Many applications planned

A blast of compressed air, water, or oil turns the trick. The parallel tubes—separated by thin webs of solid metal—are inflated and ready to go to work. It's that simple.

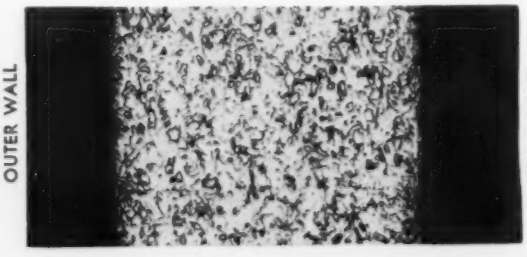
Right now, T-I-S production is limited to four materials: Phosphor-deoxidized copper, 85-15 and 70-30 brass, and 2S and 3S aluminum. It can be had in copper or brass in strip widths up to 16 in., although 24 in. widths are planned for the not-too-distant future.

Available tube sizes—as measured in the expanded condition—range from 3/16 to 1 in. A minimum spacing of 3/16 in. between adjacent tubes is essential. Maximum spacing between tubes is ultimately limited only by the width of the strip itself.

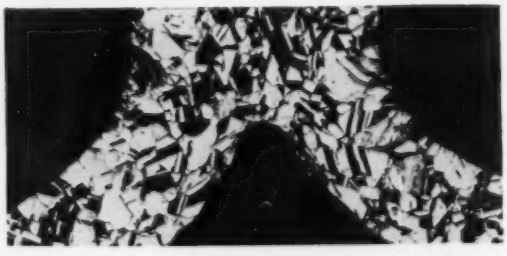
It is anticipated that the new product will find a variety of applications in heat exchangers, chemical and petroleum processing, automotive



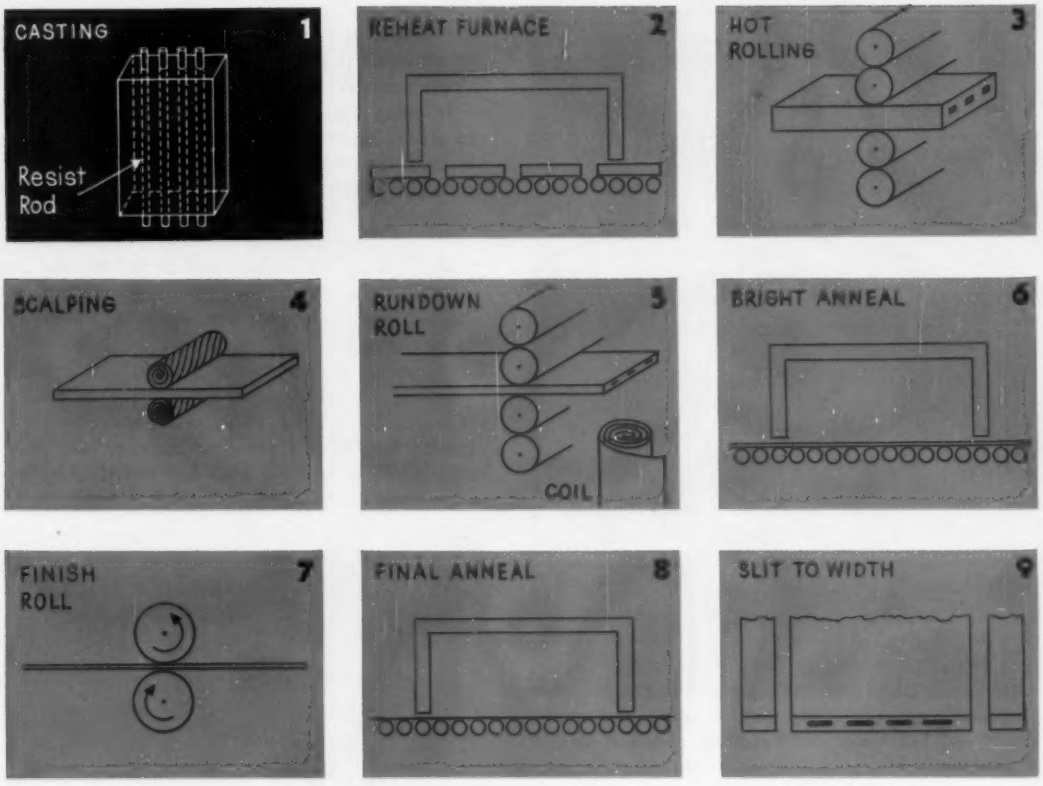
Above: Cross-sectional view of a copper Tube-In-Strip "cake" indicates positioning of resist rods.



Top-Right: Photomicrograph of inner and outer copper tube wall proves that rolling with "resist" rods does no damage to the inner tube surface.



Bottom Right: Brass Tube-In-Strip is shown at the point where the strip parts to form tube.



1 Typical copper "cake" is cast in book mold with resist rods in position. **2** "Cake" is heated in gas-fired furnace to 1400°F and then hot rolled in a four-high mill. **3** Scalping operation **4** provides clean, trouble-free surface for subsequent rolling. Several passes on rundown roll **5** cold reduce slab thickness. Material is coiled and then bright annealed **6** at about 700°F in an inert protective atmosphere. The annealed coil is finish rolled **7** to the desired gage or thickness. A final annealing operation **8** provides optimum ductility before the coil is slit **9** to desired width. When shipped in coil form, tube inflation is handled by customer.

radiators, radiant panel heating, and special electronic components. Because of ease of handling and shipping in the coil form, it may even be used profitably for special storage problems involving either gases or fluids.

In some instances, the inflated sections may be used simply to strengthen or stiffen the sheet. Building panel construction is a typical example of just such an application.

But as Revere's experience indicates, new T-I-S applications seem to pretty much suggest themselves—and at a pleasantly alarming rate. Any reasonably bright engineer can think of at least a half dozen without ever shifting from low gear.

Most of the new applications remain the customer's special secret—at least for the immediate present. But within a year, you may reasonably expect to find an assortment of T-I-S applications in home appliances, automobiles, air-conditioners, water coolers, heaters, and even beer temperature controllers at the local tavern.

In about the same period of time, important industrial applications for T-I-S will also pass from the development to the production stages. But it is unlikely that more than a few of these applications will be revealed to the general public.

Price is a selling point

In some instances, pending patents will provide the principal reason for reticence. In others, lack of patentability will result in an even more carefully guarded secrecy. Anticipating industrial demands, Revere is now sponsoring research intended to shed more light on the mechanical, physical, and heat transfer properties of their new product.

Almost apart from any specific application, the price of T-I-S is one of its most attractive selling points. In copper or brass, the new mate-

The new product incorporates tube and strip in the casting from which the strip is rolled

rial carried a moderate premium over the regular price of strip of the same width and gauge. Within recent weeks, this original premium was further reduced.

Certainly another selling point is the ease with which T-I-S can be transformed from mill coil to special assembly or end product. It can be readily stamped or drawn into desired shapes prior to the expansion of the channels. Ends and other surfaces can be easily brazed or welded.

One remarkable development: two strip ends can be Heliarc welded to each other prior to tube inflation. After inflation, tubes still remain parallel and suffer no internal interference at the weld area.

It is expected that almost all inflation will be handled at the customer's plant. Not only is the inflating process cheap but it allows for other cost savings. Ease of handling coiled strip together with its compactness in shipping are obvious advantages.

Tubes are inflated

Inflation is a cinch. After crimping or closing off one end, a needle is inserted in the tube area at the opposite end. Depending upon the pressures required, air, water, or oil is fed through the needle to provide the degree of inflation desired. A variety of commercially available pumps are capable of providing the necessary pressure.

Inflating without flat plates or other mechanical restraints produces an almost perfectly round tube. Special shapes can be readily produced by placing restraining dies or plates above and below the strip prior to inflation.

In all cases, strength of the inflated tubes actually exceeds that of standard tubing of the same gauge thickness. This added strength is probably the result of the prestressing action which occurs during inflation.

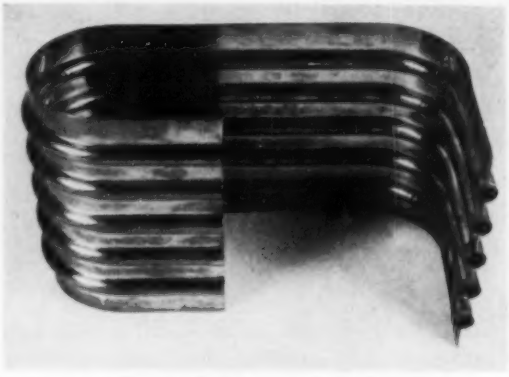
Specific credit for the T-I-S development is shared by Revere's Vice President in charge of research and development, R. A. Wilkins and his assistant, M. H. Dubilier. The new product saw its first light in a run-of-mine bull session. After it was proposed to start with a casting that incorporated tube shapes, the remainder of the problem dealt with specific production details. As it turned out, there were quite a few details.

The rolling ingot or "cake" is now poured in a conventional book-type mold. Within the mold, "resist" rods are accurately positioned to produce the desired tubing pattern. The rods are roughly rectangular in cross-section and stand vertically in the mold.

Positioning of the rods is critical. They must be precisely spaced and still be perfectly parallel to each other.

In every case, the "resist" material used must be able to meet a variety of special requirements. It must be able to withstand the effects of metal pouring temperature and still hold its initial dimensions. It must also be chemically inert in terms of the metal poured. And since the poured "cake" is to be subsequently rolled, the rod material must be friable, easily pulverized, and incapable of damaging the strip in which it is to be contained.

A typical copper "cake" weighs about 800 lb or more. After removal from the book mold, it is a slab 36 in. long, 16 in. wide, and about 5 in. thick. Heated in a gas-fired furnace to approximately 1400° F, it is then hot rolled in a four-high mill. Without altering the width, hot rolling reduces the slab thickness from 5 in. to about 0.400 in.



A sample of copper Tube-In-Strip has been preformed to shape prior to tube expansion.

After hot rolling, there follows a scalping operation which removes 0.020 in. of metal from both top and bottom sides of the slab. This operation provides a clean and trouble-free surface of subsequent rolling.

After several passes on a rundown roll, the slab is considerably reduced. Coiling follows this cold rolling operation, and the coil is then bright annealed. To prevent oxidation of the metal, a protective atmosphere is used.

The annealed coil is then finish rolled to the desired gauge and re-annealed. If slitting to width is required, this operation follows the final anneal.

Aluminum "cakes" are continuously cast to a considerably larger size and weigh up to 2000 lb. A standard aluminum "cake" is 96 in. long, 36 in. wide, and 7 in. thick. This means that the aluminum Tube-In-Strip can now be obtained in greater widths. Where more tubes are required for a single strip, this extra width is a distinct advantage.

Solve diverse problems—

INSPECTING heavy castings for minute flaws is an early application, still important.

◆ Radioisotopes' future begins today, not tomorrow . . . Metalworking applications already number thousands, each saving substantial sums of money . . . Low cost equipment makes radioscopy of pressing interest, even in small shops.

◆ One abrasive firm reports savings in excess of $100,000 annually from just one instrument . . . Present uses run the gamut, from production line control, through preventive maintenance, to product trouble-shooting both in the field and the research labs.

By C. B. MOORE, Associate Editor

What Can Radioisotopes Do For Metalworkers?

◆ RADIOACTIVITY means atomic power to many. But to metalworkers, it has a strong and practical significance.

A score of in-plant applications for radioisotopes already is saving one metalworking firm substantial sums. More than 1200 other plants are current employing radioisotopes in daily production, according to a recent AEC report on peaceful uses of atomic energy.

A large abrasives firm estimates savings of $100,000 yearly with use of just one thickness gage activated by radioisotopes. The Atomic Energy Commission draws on its own records to speak authoritatively of nationwide industrial savings through use of radioisotopes in the $63 to $180 million range.

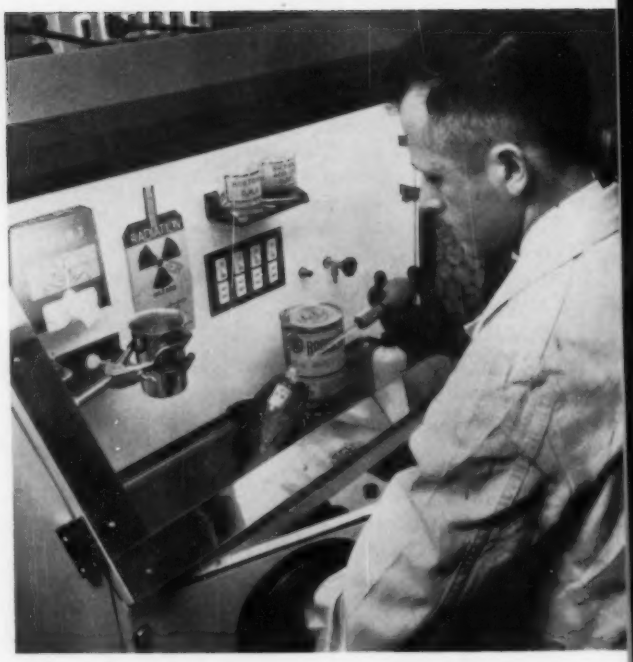
Metalworking uses for radioisotopes are increasing at a gallop, and are so diverse they are difficult to classify, much less comprehend. Applications range from automatic gaging and control of sheet thickness at rolling mill speeds, through low cost preventive maintenance inspection, to such production uses as improved paint spraying.

In all cases, applications are proving themselves either by doing the required job easier or faster, or by cutting costs well below those of prior methods. X-ray examination, for example, may be a design specification. Often equipment costing near $50,000 is required. Radioisotopes and associated equipment are performing many of the same functions at a cost in the $3000 range. This cost factor brings radiological inspection within the reach of even small fabricating shops.

On the production line, radioisotopes are

Here's What Isotopes Do In Production

- **automatic charging of raw materials to blast furnaces**
- **automatic gaging and controlling sheet thickness in rolling mill**
- **measuring residual pressure in vacuum melting furnace**
- **checking molten metal level in cupola**
- **confirming need of sintering equipment in iron reduction operations**
- **determining best production rate of sintering furnace**
- **improving paint spraying by eliminating dust**



Right: RADIOISOTOPES help answer the question, "Why does this metal rust faster than that?"

finding new applications sporatically but persistently. At Ford Motor Co., several operating divisions are using gamma ray radiation widely. Applications in most cases appear readily adaptable by a large segment of the metalworking population.

Source of gamma rays commonly is such artificially radioactive elements as cobalt 60, selenium 75, cesium 137 and iridium 192. All are available through AEC.

Automatic charging of cupolas is controlled by radioisotopes. Raw materials including metal scrap, limestone and coke are introduced into the cupola. The equipment easily distinguishes between molten metal, slag, scrap and coke, and pinpoints the level of each in the stack.

Conventional gages incorporate air-operated probes pushed into the stock at predetermined levels. If these probes meet an obstruction, they immediately retract, indicating a full stack. In operation, the probes are unreliable. They may enter a void, producing false indications. They may bend, jam or otherwise misgage.

Metalworking Research

- **determining effects of additives on nodular iron**
- **tracing distribution of alloys in steel**
- **following metal flow patterns in cold extrusions**
- **evaluating life of tools and dies**

The radioisotope gage has a radiation source on one side, and a Geiger counter on the other side of the cupola. Early experiments proved the arrangement so reliable, it now is interconnected to the charging mechanism, and handles the entire operation automatically.

In vacuum melting, efficient gas removal to a low pressure is essential. One commercially available gage measures gas pressure through radiation variations. The radioactive source charges residual gas molecules with electrons. As gas passes over the Alphatron detector, its ionizing current is measured, amplified and translated into terms of pressure.

Trace iron ore losses

Tracer elements too play their role in production of ferrous and nonferrous metals. In one of the largest tracer applications yet conducted, suspicions of waste in reduction of iron ore fines were dramatically confirmed. Survey results conclusively proved that in furnace operation about 60 pct of the finely powdered iron ore disappeared up the stack. A sintering furnace was recommended as a direct result.

Less than 2 millicuries of radioactive material were used. Total radioactivity was only 10 pct higher than met while sunbathing at the beach. Cost of the survey was low. Other means of extracting the same information would have been laborious, time-consuming and in the end only partly conclusive.

With less than the amount of radioactive material considered dangerous to humans,

Ford also has accurately determined the operating cycle of its sintering furnace. The radioisotope was introduced, and its progress followed with radiation detectors throughout the furnace cycle. Information thus gained enabled closer control of the process, more efficient use of equipment, and lowered over-all production costs.

A painting problem lent itself equally well to solution through radioisotopes. Scrap rate of numerous plastic parts painted or metallized at Ford was higher than desired due to the material's tendency to collect and firmly hold particles of lint and dirt. The trouble was traced to large charges of static electricity building up on the plastic surfaces.

Radioactivity ionizes air

Resulting contamination is most difficult to remove. The only feasible solution is to dispel the electrical charge, after which the part can be cleaned conventionally. A commercially available air gun is used. The Alphatron blow gun has a radioactive source which ionizes the air passing near it. Blown in the direction of the dirty part, the air neutralizes the static charge of the dust.

Sorting too is possible by means of radioisotopes. A beta ray emitter may be used to classify sheet steel according to thickness. Interlocked with an automatic alarm system, it can be used in stamping operations to reject an overly thick sheet that may damage dies. The same apparatus may be modified to provide control of press adjustments for most efficient use of stroke pressures.

In weld fabrication, inspection through use of radioisotopes is reported to permit savings of roughly 12 pct in required plate thickness, hence in the weight of steel necessary. This also is reflected in a nearly 25 pct reduction in the volume of welding required. The savings are implicit (according to one interpretation) in ASME fabrication codes, which permit an increase from 80 to 90 pct in the allowed strength of a welded seam if it is inspected by radiography.

Gamma rays from radioisotopes also are hitting hard at preventive maintenance costs. In another Ford application, stabilizer castings in the tail section of its company planes must be inspected every 200 flying hours. They cannot be checked visually, since the castings are encased in the tail section. Radioscopic inspection avoids the need for disassembly. Even better, the check is carried out in the field.

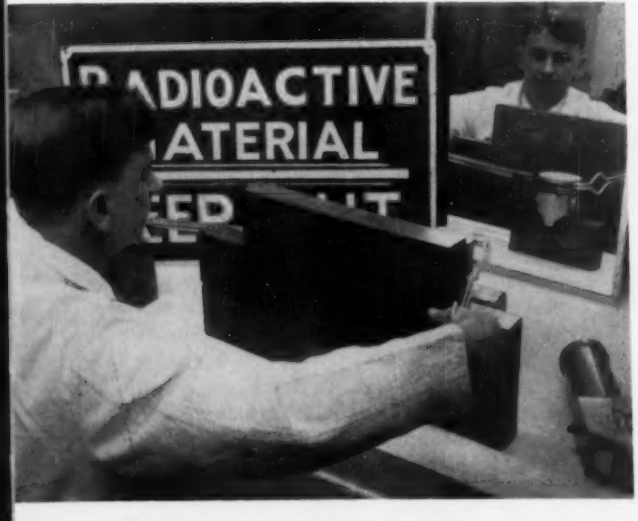
Inspection of entire piping systems is practicable without shutting down the power source, particularly important with high pressure steam equipment. Ford cites an emergency in which a 4-in. high pressure steam line ruptured under load. The question arose whether or not the entire powerhouse should be shut down for extended inspection and repairs.

By inspecting the lines with radioisotope equipment, dangerously eroded pipes were easily spotted. A costly and time-consuming major repair program was avoided by replacing only those pipe sections found unfit and in hazardous condition.

Use Isotopes for In-Plant Inspection

- **inspecting welds in high pressure steam lines**
- **field inspecting welds in office building frame**
- **troubleshooting obstructions in pneumatic tube conveyor**
- **detecting cracks in 100-ton hooks**
- **avoiding powerhouse shutdowns in steam line inspection**
- **inspecting 30-ton slag pots for suspected defects**
- **detecting cracks in trunnions on metal ladles**
- **inspecting inaccessible tail parts in company planes**

LEAD BRICKS protect operator from gamma ray radiation. Piston rings are examined for wear.



Bigger, better adapted—

Watch These Trends In Punch Press Purchasing

◆ There's a growing awareness among dieing machine and power press users that these can be more than just moderately well-chosen hunks of cast iron, powered to do a particular job . . . Result is a modified approach.

◆ From this, three buying trends emerge . . . These include a swing to heavier-than-needed equipment, more package purchasing, more closely coordinated buyer-supplier engineering . . . Benefits? Well, read on a bit.

By W. S. RENIER
General Sales Manager
Henry & Wright Div., Emhart Mfg. Co.
Hartford, Conn.

◆ THREE definite trends are notable in the purchase of power presses and dieing machines. Examples began emerging several years back, but by now are sufficiently well established to be properly tabbed as trends.

Perhaps most noticeable is the decision by several companies to purchase machines of substantially greater capacity than the job load. This is particularly true in the field of laminations, but is also noticeable wherever progressive dies are used.

An example is one midwest plant of a large manufacturer of laminations. Here a definite rule has been set calling for the use of a machine at least double the calculated load of a job. Another plant of the same manufacturer has also settled on the heavier-than-needed approach to dieing machine purchases. Interestingly enough, although both divisions use the same basic purchase plan, each reached its decision independently.

In New Jersey, a small manufacturer of electrical laminations is following the same pattern, again individually arrived at. Other companies, too, in and out of the lamination field, are showing a tendency away from the get-by-with-a-minimum idea.

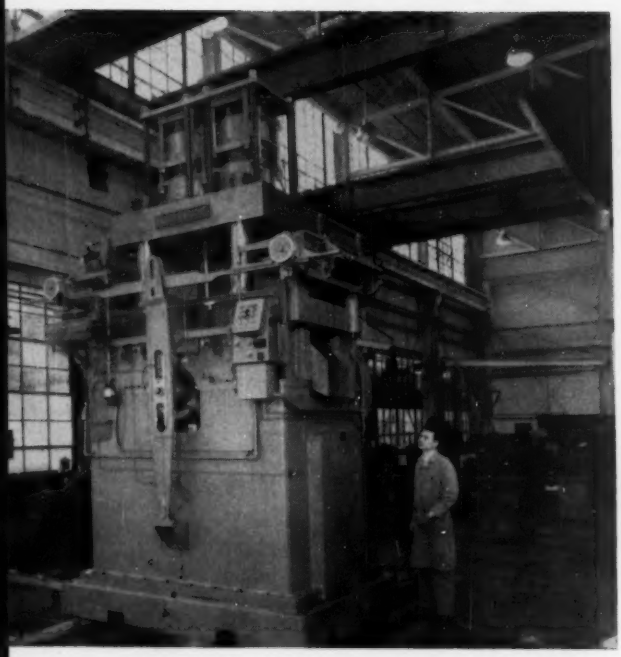
Advantages of this heavier machine approach are numerous and extremely practical. The reduced strain means substantially increased die life. When the cost of a progressive die is taken into consideration, increased die life may well represent an important economy to the user.

It is also well established that the use of heavier equipment reduces maintenance and downtime because vibration and shock is substantially reduced, easing press damage. This factor, and the ever-present consideration of die life, has been the reason why one of the country's largest manufacturers of electrical appliances and components has made this a set policy for a number of years.

Reduced noise level

A third, corollary benefit is that heavier-than-needed machines greatly reduce the noise level in a plant. Once considered a good employee relations idea, noise level reduction is rapidly becoming a matter of law. First state to enact a noise level control law was Wisconsin, but other states have been studying similar bills and it probably will not be long before all the major industrial states set legal control on allowable plant noise level limits.

Reduced vibration effects on the building must also be considered, since this reduces shock and damage to other machines and to the building itself. In one case, vibration from a battery of



TYPIFYING TREND toward heavier-than-needed equipment is this 400-ton dieing machine. Unit will be put to work producing automotive brake parts at 45 to 90 strokes per minute.

presses was sufficient to destroy the accuracy of a group of spot welding machines.

Finally, the use of heavier equipment provides extra flexibility since it permits fitting the job to the press, rather than fitting the press to the job. It also adds a margin of safety for model changes incorporating extra operations.

One result of this trend to higher-rated equipment is that, as a builder we have discontinued production of our 10-ton machine. On the other end of the scale we recently completed a 400-ton unit, which will produce truck brake parts at a rate of 45 to 90 strokes per minute. Several other firms have indicated an interest in this large machine.

Naturally, the biggest stumbling block to universal application of this principle is the substantially greater capital investment required. However, even this is not over-riding. Not when increased die life—and it is not unusual for a progressive die to cost more than $20,000—and reduced maintenance are considered. These help in large measure to offset the initial cost of the equipment.

A second observable trend is the so-called package purchase. The buyer today is more frequently requesting the machinery builder to accept the order as a package—machine and complete tooling. In our case, for example, although we do not build dies, we are often asked to not only engineer the dieing machine but to specify and order tooling as well.

With this arrangement, when the tool is delivered it is set up on the press in the builder's plant and, using customer-supplied stock, a test is run. Any necessary adjustments are then made, and machine and tooling are shipped to the customer.

This differs from the usual method, since the machine is tested with the same tooling and stock that will be used in its regular production run.

More cooperative engineering

Possibly a reflection of this trend toward package purchase is the growing tendency toward cooperative engineering between machinery builder and customer. The engineering staff of the press manufacturer is called in more often on the production problem before the press is built. In this way, customer and supplier engineers, each expert in their own field, discuss the various problems in the customer's operation.

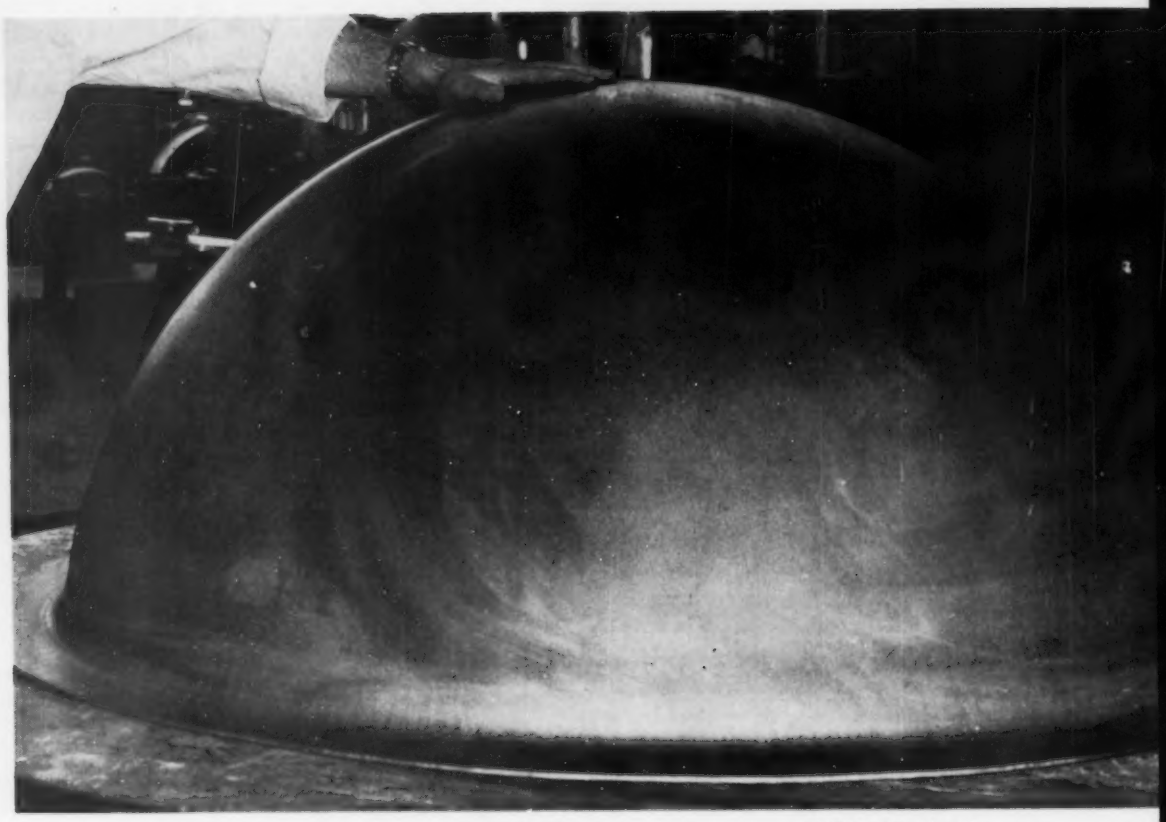
The supplier engineer is then in a position to suggest special modifications in either press or product which will simplify production. At the same time, the customer learns the best method of using the equipment for trouble-free, continuous operation.

Contrast this approach to the one in which the machinery builder is given strict specifications for a definite capacity machine. Since the product to be turned out is not known, and because the builder has no knowledge other than that supplied him by the customer, he must to a large degree, build his press without being able to use his specialized engineering knowledge.

In one such case, one of the country's largest electrical firms ordered two standard 150-ton dieing machines with some extra equipment. The presses were built and shipped. Within two weeks the customer complained that the machine had slowed down and was not operating satisfactorily. Before anything could be done, the press was down.

Although we had repeatedly been assured that the load on the machine was well within machine limits, on-the-spot investigation showed that the actual load on the machine was more than 275 tons—almost double the rated capacity. Our engineers were able to stop the second press and recommend changes in the die that prevented serious damage. Repair of the first machine was costly and time-consuming, and resulted in substantial production loss due to downtime.

These three trends, then, use of heavier equipment, package purchase and cooperative engineering, reflect a growing awareness by the customer that a press is more than just a moderately well-planned arrangement of cast iron; that it is in fact a precision-engineered machine which, properly selected and used, may make the difference between profit and loss.



LUBRICANT has been removed but scale is intact on large hemisphere drawn from 0.178 in. sheet.

Solves corrosion problems—

Titanium Invades New Fields With Deep-Drawn Parts

By W. E. LUSBY, JR.
and L. J. BARRON,
E. I. duPont de Nemours & Co., Inc.,
Wilmington, Del.:
and R. J. PARDO,
B. H. Hubbert Co., Baltimore

◆ Take some deep drawing know-how, add it to titanium's super corrosion resistance, and you have an answer to a number of problems in chemical and food processing plants . . . What's more, deep seamless sections can be drawn hot or cold.

◆ Here's the story of how sheet titanium was drawn into deep hemispheres to make steam kettles for cooking food . . . It gives complete trial data, the actual production method, and a set of recommendations for hot and cold forming.

◆ SUCCESSFUL deep-drawing techniques for titanium sheet are clearing a way for the food, chemical and other process industries to benefit from the metal's exceptional resistance to certain corrosive atmospheres.

For example, deep-drawn hemispheres of titanium have been made into steam jacketed cooking kettles for food processing. Firms cooperating in this project were the B. H. Hubbert Co., Republic Steel Corp. and the DuPont Co. Actual deep drawing work was done at the Hubbert Co. plant in Baltimore. The knowledge acquired from this job indicates that hot or cold deep drawing, for these and other products, can be done on a commercial basis.

The food processing industry, in particular, faces some unusual corrosion problems. Very often a negligible corrosion rate, so far as equipment life is concerned, may still be enough to impair food color, flavor or odor.

But tests on a wide variety of food products indicated that titanium was not attacked in any fashion, nor did it affect food color or flavor. For this reason, a decision was made to fabricate a 250-gal, steam jacketed, titanium cooking kettle, and to evaluate the ease or difficulty of its production.

First consideration was how to fabricate the hemispherical shells of the steam chamber. These are normally made either from seamless, deep-drawn sections, or from welded, "orange peel" shaped segments. Although there was no information available on deep drawing titanium shapes in the large size required, this fabricating technique was chosen.

Drawn shell eliminates corrosion

Here are some of the reasons that led to the decision: (1) past experience in the food industry favored seamless shell design for most reliable operation; (2) past experience with preferential corrosion at the welded seams of other types of alloy kettles (although titanium welds had not shown this type of attack); (3) relative simplicity of fabrication; (4) know-how in this type of forming would prove valuable in extending the use of titanium in other fields.

Although the inner shell of the kettle is the only one that contacts the food being prepared, the outer shell or steam jacket also had to be made of titanium so that it could be welded to the inner shell. This is because ductile welds between titanium and other metals are not yet obtainable.

Inner shell of the 250-gal kettle is a 45-in. diam hemisphere drawn from 0.172-in. thick sheet; the outer shell is a similar shape formed from 0.125-in. sheet. Blanks for both shells were 66 in. in diam.

Before attempting to form the large hemispheres, a series of experiments were performed with smaller blanks. Conditions for these preliminary trials were purposely selected to provide more severe deformation than would be encountered in the full-scale project. Material chosen for the trials was the unalloyed titanium grade RS-55, with a minimum yield strength of 55,000 psi. Its strength is comparable to that of metals currently used for steam kettles, and it has good forming qualities.

Summary of Deep-Draw Test Data

Blank Diam. (in.)	Blank Gage (in.)	Titanium Grade	Stage	Total Draw Depth (in.)	Estimated Draw Temp. (°F)	Max. Thrust Press (Tons)
24	0.078	RS-55	1	2.5	500-600	180
			2	5.5	500-600	180
			3	10.5	500-600	100
			4	11.0	500-600	—
24	0.172	RS-55	1	8.13	600-700	220
			2	9.75	600-700	100
24	0.172	RS-55	1	8.25	80	250
			2	9.75	80	—
66	0.178	RS-55	1	9.0	500-600	140
			2	14.25	500-600	260
			3	18.00	500-600	320
			4	21.00	500-600	280
66	0.125	RS-70	1	8.25	500-600	100
			2	13.25	500-600	160
			3	16.25	500-600	260
			4	18.62	500-600	240
			5	20.62	500-600	200
			6	22.9	500-600	100

The press used for all testing, as well as full-size hemisphere forming, was a 500-ton, double action hydraulic unit equipped to accommodate free-forming punch and draw ring setups. All preheating and interstage annealing was done in an oil-fired furnace.

Blank temperatures for the initial test draws ranged from 500-700°F. Furnace temperature was held at 1200-1250°F to allow for heat loss during transfer of blanks to the press. This temperature developed a thin oxide film on the metal to provide a base for applied lubrication. Preheating and annealing times were held to the minimum necessary to yield uniform blank temperatures. Average was 10 minutes for preheat and eight minutes for interstage anneals.

Lubricated in graphite

Lubricant was a heavy suspension of Dixon graphite in Oakite compound. This was judged to be an adequate enough insulator so that the punch and draw ring were not preheated.

Blanks for the initial tests were 24-in. diam circles of RS-55 grade in both 0.078 in. and 0.172 in. gage. The draw ring had a 14 15/16 in. ID with a draw radius of 3/8 in. Pressure on the hold-down platen was set at 2200 psi, the same as used with stainless steel.

FIVE-gal steam-jacketed titanium kettle was made from shells drawn in experimental tests.

The first experiment drew the 0.078 in. blank to a total depth of 11 in. in four stages. There were no difficulties and final surface finish was excellent. Next, the 0.172 in. blank was drawn to a total depth of 10 in. in two stages. Again, there was no galling and a satisfactory surface finish was obtained. A 5-gal. welded kettle made from these test shells in shown above.

A test to gage the practicability of cold forming was next on the schedule. A 0.172-in. thick blank was heated at 1200°F for 10 minutes to induce a thin oxide film. It was then air cooled to room temperature and drawn to a depth of 8⅛ in. in one operation. The lubricant was Oakite, minus the graphite.

Omitting any annealing, an attempt was then made to draw the remaining lip flange into a complete cup. When cup depth reached 9¾ in., a crack occurred at the edge of the blank and extended 1 in. downward into the cup. Examination revealed that it initiated at a notch in the edge of the blank which resulted from the circle-shearing operation. Over-all surface finish, however, was excellent.

Cold forming possible

Although the test indicated that cold drawing might be readily accomplished with proper edge preparation of the blank, forming of the large hemispheres was done with heated workpieces for an added safety factor.

Draw ring for the large shells had a 46⅛ in. ID with a draw radius of 1 in. Republic Steel Corp. supplied the material: one sheet of RS-55 grade, 66 in. square and 0.178 in. thick; and one 66-in. square, 0.125-in. thick sheet of RS-70 grade. Blanks were cut with circling shears and carefully edge ground to remove all irregularities.

The 0.178-in. heated blank was drawn to a total depth of 21 in. in four stages. During the final draw the punch was withdrawn momentarily after increasing the depth by about 2½ in. It was then lowered and the thrust pressure increased. As the metal began to move, a sharp click indicated a fracture.

Inspection showed a circumferential crack 5½ in. in length within 1¾ in. of the lip of the shell. It did not appear to be a tensile fracture, nor was there any evidence of localized inclusions or segregation. However, the failure did occur where some grinding lines were roughly normal to the direction of drawing. It followed these lines, extending from one to another in a series of steps. Belief is that the grinding lines acted as notches to initiate the cracking.

Fortunately, however, the undamaged section of the shell was still large enough so that it could be used for kettle fabrication.

The next drawing operation was performed on the heated 0.125-in. thick blank. This was formed to a depth of 23 in. in six stages. During the final stage several fractures occurred below the lip, but they did not appear to be associated with the presence of grinding lines. These fractures occurred without audible warning and were distributed around the entire circumference of the shell. Again, in this case, the undamaged shell section was sufficiently large to allow kettle fabrication.

Control surface contamination

Closer examination of the metal adjacent to the fractures did not reveal any unusual change in analysis or structure that could account for their occurrence. However, there was some indication that they could have been initiated by surface imperfections. This leads to the conclusion that surface contamination might be minimized by increasing the depth of draw and using fewer draw stages. It is thought that the cold working effect of deeper individual draws may also be advantageous.

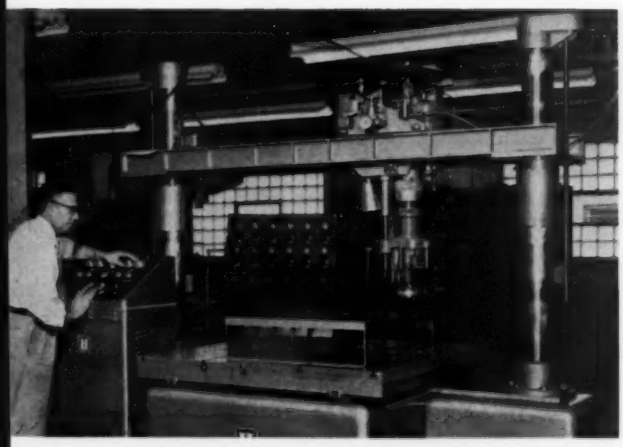
Judging from the test results, it would seem that deep drawing of large titanium shapes with free-forming dies can be done on a commercial basis. Both warm and cold methods seem practical, but more experience is needed.

In the work done at the Hubbert plant, compression wrinkling did not occur, indicating that there was sufficient hold-down pressure. Moreover, lubrication presented no problem. But surface finish and edge preparation seemed to be critical factors, worthy of close attention. Conclusions are that initial surface finish should be free of deep grinding scratches and inclusions; a pickled finish is preferable and all sheared edges should be ground carefully to remove any nicks or slivers.

Test experience also showed that for cold drawing, the thin oxide film formed by heating and air cooling will help to prevent galling. Also, Interstage annealing should be carried out between successive hot or cold draw stages, regardless of the amount of deformation that has taken place. A final recommendation for deep drawing titanium is to use a slower press ram speed than is normally used in forming stainless steel.

No layout needed—

Speed Drilling With a Flexible Setup



CONSTANTLY CHANGING drilling requirements are met with this flexible automatic drilling machine by turning a few dials, pushing some buttons. Up to five different holes can be made at once.

◆ DIAL IN the coordinates of a desired hole location, push the proper button—and the machine does the rest. It drills a hole of the right size where you want it.

That's the sequence with a recently-constructed, electronically-controlled special drilling machine built by Farwell Metal Fabricating Co. of St. Paul for use in its own plant. The machine drills holes of varied size and spacing for mounting instruments and dials on master panel boards for industrial control systems, commercial heating and air-conditioning, etc.

Chief advantage is substantially reduced drilling time per hole. This because the system eliminates the traditional process of manually laying out, checking center punching and hand-drilling. Human error is also minimized. But why this type control system? Minneapolis-Honeywell engineers, who designed the control equipment, say it fits the machine to the large area of machine control operations where automatic numerical control isn't feasible, for cost or other reasons. In this case, control through punched cards or tape, while possible, would not have improved the machine's productivity to any great extent because drilling requirements are seldom duplicated. Panels are highly individualized units. Mounting hole numbers, spacing, location, range of hole diameters required may range all over the map.

In addition, panels themselves differ. Some may be small, others 4 x 8 ft or larger. Some are drilled as flat sheets, while others are fitted prior to drilling with integral mounting brackets or legs. Even material varies. Mostly it's ⅛ in. steel, but ½ in. masonite is also finding wider application.

A traveling drill head and movable table permit positioning of the cutting tool over the workpiece. Since both can move up to 4 ft perpendicularly, any point in a 4 x 4 ft area can be machined. Step methods permit handling of larger sheets. Head and cross-rail assembly can be raised or lowered to accommodate panels of various heights and shapes.

Simultaneous drilling of up to 5 holes of varying dimension, with accuracy of 0.005 in., is possible through a multiple-spindle attachment on the drill head. A variable-speed motor provides proper spindle speeds for drills as small as 1/32 in., while use of a belt reduction permits sawing or fly-cutting of holes up to 6 in. diam. Thus both clearance and mounting holes for an instrument can be drilled at one pass.

Drill head and table are positioned by conventional positional servo-mechanisms, controlled by dials on the control console. Other controls provide for jogging all machine motions, control of spindle speed, sequence of drilling operations, and permit choice of constant feed or constant thrust drilling. Indicator lights show that all positioning is correct.

OPERATOR POSITIONS platen easily with this control knob, when setting up dies or at other times when sensitive position control helps. Calibrations show platen position on press.

Gives faster cycling—

◆ Modern pressworking frequently calls for maximum flexibility in speed, but with a minimum of fussing . . . A newly-introduced servo control system for hydraulic presses now gives fingertip control over six speed changes.

◆ Demonstrated on a 575-ton triple-action drawing press, the system permits zero-to-maximum adjustment within each speed range . . . Additional speed ranges can be added . . . Advantages are new highs in convenience, speedier setups, reduced cycle time.

By G. S. WRIGHT
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New Control Makes Press Operation Easier

◆ PRESS-FORMING stainless steels, titanium, alloys of high nickel or cobalt content or various other work-hardening alloys poses special problems. Presses must be capable of a range of speeds. This will permit slow-forming, yet reasonably fast overla-l operating cycles with a minimum of shock.

A newly-developed speed control system greatly simplifies the drawing of these difficult metals. The flexible new system permits the operator to completely regulate all hydraulic press motions from a central control panel. Simple, radio-type dials permit full-range adjustment of blankholder and draw platen speeds, from zero to maximum, during any portion of their stroke either up or down.

Result is a new high in convenience of varying press speeds, in addition to savings in cycle time.

The Oilgear and Raytheon companies developed the control jointly. The first unit has been incorporated into the design of a 575-ton Farquhar Triple-Action drawing press. Recently demonstrated, this press is destined for forming operations at the Portsmouth Navy Yard.

Six speed changes (more can be added) are provided by the magnetic-hydraulic servo amplifier control system, as against three normally provided on standard presses. Speed adjustments are simply dialed in by the operator, without leaving the control station. This can be located for maximum convenience. Manual, semi-automatic or full automatic cycles may be selected.

To obtain the desired fast cycle of press opera-

tion with minimum shock, 5 different speeds were provided for the automatic cycling of the 575-ton demonstration press.

These consist of a fast approach speed, for which the full volume of the 2-way variable-volume pump was used, a pressing speed variable to suit work conditions; a slow stripping speed because on some drawing operations full speed of the press cannot be used in removing the punch from the work; a fast return speed to insure a fast cycle over-all, and a slow return speed to insure that the moving main platen will pick up the blankholder platen with a minimum of shock; and a fast return for the remaining portion of the stroke. Also, a position control permits the operator to position the platen of the press easily in response to the movement of a dial when setting up dies, etc.

Governs press in motion

With this closed loop system, the operator has fingertip control of approximately 8 tons of moving platen.

Essentially, the system boils down to being a 150 horsepower pump unit with a servomechanism. It consists of a magnetic amplifier, an electric servo motor and followup potentiometer, a two-stage hydraulic amplifier and the command position potentiometer and preset unit.

When the operator has made his dial setting they can be recorded along with die information and used at any later time for duplication of the draw operation, should a repeat job come up. This feature of reproducibility also, of course, serves to reduce setup time and expense.

Typical sequence

During a typical semi-automatic cycle with this 575-ton draw press, it is possible to obtain the following sequence:

With the press in the up-stop position, both the draw platen and the blankholder will be in the up position. The operator loads the work blank in the press and touches the cycle start button. Blankholder and draw platen then make a fast approach to the work. Speed during this portion of the cycle is fully adjustable from zero to maximum, simply by setting the control box dial.

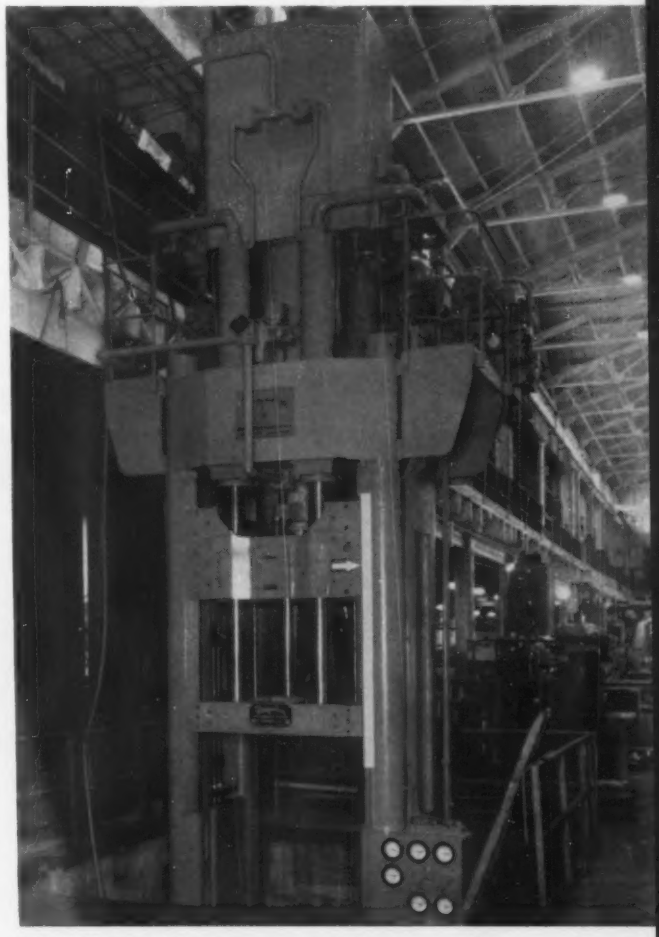
Speed then shifts from the approach cycle rate to proper pressing cycle speed, upon contact with a limit switch. These limit switches are adjustable. Blankholder and draw platen then continue downward, the blankholder contacting the work and building up to the desired tonnage. Pressure range adjustments from zero to maximum are possible on each corner of the blankholder independently. With the work contacted, the draw platen will then continue down until the draw has been completed.

Speed changes during this portion of the cycle are fully adjustable from zero to maximum, simply by turning a dial on the control box to the desired speed. At the end of the stroke, either a position or pressure switch reverses the draw platen. The reversal point is also fully adjustable, to cover a full range of stroke or pressure. On reaching its final point, the draw platen goes into stripping and reversing action.

Ability to adjust for a slow stripping speed is a unique point of the control. Stripping usually is carried out at maximum press speed, which on particular forming operations can be highly undesirable. In this case, stripping speed is again fully adjustable.

After slow stripping action is completed, press return will shift to high speed until it approaches the pickup position, where it slows to softly pick up the blankholder. With the blankholder contacted, the press will then continue at maximum speed to the up stop position. During the entire cycle, the operator can vary speeds by simple control knob adjustment to suit any special operating condition.

Increased flexibility in press cycle undoubtedly will be reflected later in lower production costs. Scrap, for example, may be down.



DEMONSTRATED with new control system at Farquhar Div. plant, this 575-ton draw press will simplify stainless forming operations for Navy.

Handles 9-ft lengths—

Table-Type Grinder Holds Close Blade Tolerances

◆ HIGH-SPEED STEEL SHEAR BLADES are being ground to a precision of 0.0003 in., in a two-setting operation at National Cash Register Co.'s Dayton Plant. Methods formerly used, according to operators, gave tolerances of about 0.006 in.

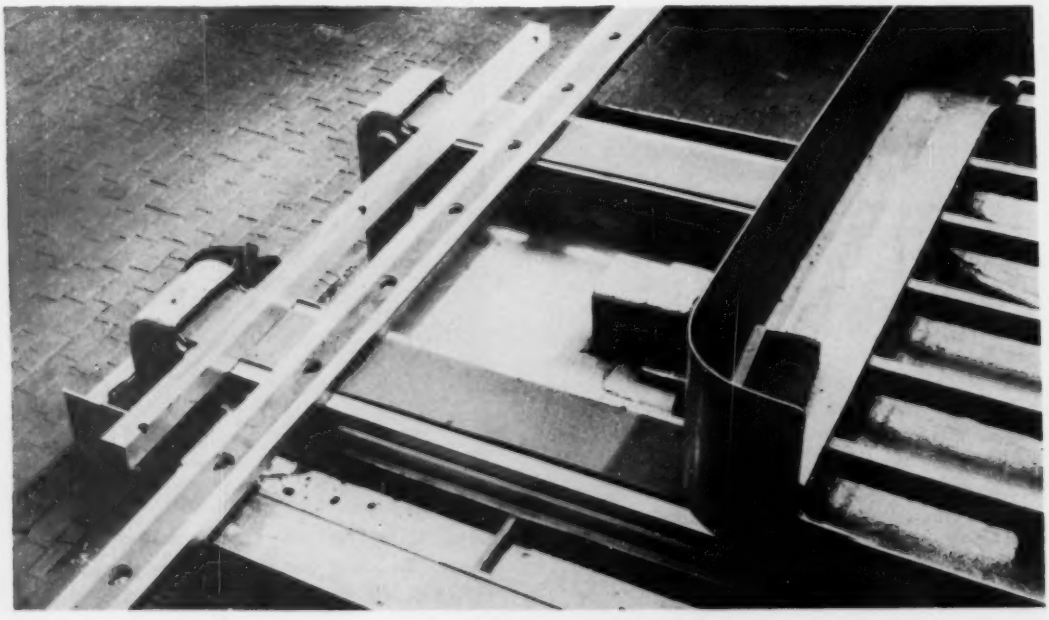
The 9-ft long blades are used for shearing cold-rolled and stainless steel in various thicknesses up to a maximum of ⅛ in. Blades are 4 in. wide by ¾ in. thick.

Keeping edges of these shear blades in the best of condition is a good test of a grinder's ability to hold tolerances. When properly fixtured or jigged, a shear blade can be held on edge so as to grind its top edge perfectly square or at any selected slight departure from square. Not all operators are agreed on the precise angle to which the cutting edge of a shear blade should be ground, some holding that it should be perfectly square for cutting steel, others arguing that a slight departure from the square is preferable, especially for shearing softer materials.

Since the theory of shearing is more that of fracturing the material by highly concentrated stress, rather than actual cutting, the usual grinding range for cutters is from 2° to 5° removed from the square. Instances have been known, though, where an 80° angle has been used.

National Cash Register grinds cutting edges of these 9-ft blades to a 5° angle. The job is done on a Mattison horizontal spindle Plano-type grinder with a traveling table, one end at a time since the blades are so long.

HIGH ACCURACY GRINDING is important in sharpening edges of high-speed-steel shear blades like this one, shown lying across ways of the Plano grinder. Edge was ground to 5° angle.



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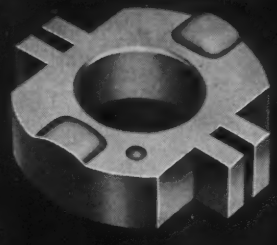

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New Technical Literature:

Catalogs and Bulletins

Alloy, stainless steels

A new edition of an alloy and stainless steels catalog for the process and manufacturing industries is now available. It has been increased from 68 to 102 pages to include corrosion resistant data, chemical composition, representative mechanical properties of corrosion resistant, heat resistant, impact and abrasion resistant alloy steels. Also described are the firm's facilities for the production of static, shellcast and centrifugal castings. *Electric Steel Foundry Co.*

For free copy circle No. 1 on postcard, p. 81

Vertical lathe

Bulletin No. VL-1 describes a new vertical automatic production lathe. This unit, the bulletin states, is a basically standard machine with platens for mounting turning or grooving slides, multiple tool slides, or tracer slides. Several tooling set ups are included to show the range of application this machine has for production turning. The vertical type machine, the bulletin says, requires a minimum of floor space, and simplifies the application of automatic handling. *Sundstrand Machine Tool Co.*

For free copy circle No. 2 on postcard, p. 81

Fasteners

Rivet sizes, specifications and prices have been compiled into a brochure just published by a producer of cold-headed fasteners and other special parts. The brochure presents a stock-price list covering small rivets, culvert rivets, plating, burrs, American Standard head dimensions and kegging information. Drawings illustrate the company's clevis pin specifications and other cold-headed specials showing threading, knurling, shaving, pointing and drilling. *Brainard Rivet Co.*

For free copy circle No. 3 on postcard, p. 81

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 81.

Wire rope

New specifications and information regarding proper use of plastic coated wire rope are now available in circular No. 5610. Plastic coated wire ropes having strengths from 480 to 7000 lb, weighing from 13 to 153 lb per 1000 ft, are shown. Minimum safety factors, sheave and drum diameters, and tread pressure formulas are also included. *Macwhyte Co.*

For free copy circle No. 4 on postcard, p. 81

Roller coaters

Entitled "Union Roller Coaters" a new 6-page booklet is now available. It covers this firm's 5, 25, 35, 45 and 55 roller coaters as used in coating applications for wood, metal, paper, plastic, cork, fabric, rubber, veneer and cardboard. Complete specifications and numerous illustrations of on-the-job applications are included in the booklet. *Union Tool Corp.*

For free copy circle No. 5 on postcard, p. 81

Fasteners for roofing

A 4-page folder describing the use of one firm's fasteners for application of roofing and siding materials has just been published. The folder gives details on how the design of these fasteners with their assembled Neoprene washers form an effective watertight seal when applying roofing and siding of aluminum, galvanized or stainless steel, protected metal and insulated panels. *Townsend Co.*

For free copy circle No. 6 on postcard, p. 81

FREE LITERATURE

Fluxing procedures

This manual, "A Complete Guide to Selective Fluxing for Low Temperature Silver Brazing," is a reference work on proper fluxing practice. It is also recommended as a guide for the correct selection of flux based on specific temperature ranges and metals to be joined. A complete flux selector chart is included in the manual for this purpose. The applications and characteristics of one firm's fluxes are thoroughly outlined in the booklet. The manual contains the first published data on two of their new fluxes; Deoxo, an advanced general-purpose flux and APW Black Flux, which introduces a new idea in fluxing action. *The American Platinum Works.*

For free copy circle No. 7 on postcard, p. 81

Threader, chucker

Illustrated catalog in 2 colors describes newly designed automatic threading and chucking machines. This revised publication pictures and gives advantages of the H1 hob threading machine, for precision, internal, external, right and left hand threads; the L1 automatic threading lathe, for precision, square, standard and 29° threads, internal or external; the threadmaster thread milling machine, for precision, long and short traversing, elevating, cross feed and lead screws; and the T5 single spindle chucking machine, for drill, ream and counter bore, face and form turn. The T5 performs multiple operations in one chucking. *James Coulter Machine Co.*

For free copy circle No. 8 on postcard, p. 81

Diesel engines

"Why Cat Diesels Are Best" is the title of a 16-page booklet which lists some of the features incorporated in the manufacture of cat diesel engines. Their reported advantages and the characteristics which distinguish them from other diesels are explained in this booklet. Turbocharging is discussed and a schematic drawing supports the resume. Actual photos of customer installations with accompanying testimonials are shown. *Caterpillar Tractor Co.*

For free copy circle No. 9 on postcard, p. 81

This Quick Demonstration At Your Desk Will Prove

How To Get Better, Economical Fastening With Townsend Lockbolts

A few minutes of your time invested in watching a simple demonstration of a better fastening method may point the way to savings of thousands of dollars in assembly of your products. The Townsend lockbolt provides a quick method of producing tight, rigid fastenings that cannot loosen even under extreme vibration or shock conditions.

We would like to have a Townsend engineer demonstrate to you and others in your organization how these lockbolts combine the advantages of riveting and bolting—eliminate the disadvantages. He will show you that installation is fast—that fewer workers can complete an assembly in less time—you improve your product—achieve a lower installed cost.

You will be able to see why the clamping action, or clinch, of Townsend lockbolts is higher than rivets—is more uniform than bolts and nuts. The demonstration will explain how the lockbolt fills the hole better than other fasteners—makes possible a more rigid joint and provides an effective liquid seal.

Townsend lockbolts are available in steel and aluminum alloy, in 3/16", 1/4", 5/16" and 3/8" diameters, in grip length ranging up to 2", in various head styles.

For a demonstration on how to speed production, get tight, secure, permanent fastening with Townsend lockbolts write on your company letterhead to Townsend Company, P.O. Box 237-B, New Brighton, Pa.

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AA-2911 A

In mines and quarries . . . on the big construction jobs—that's where trucks take the worst beating. And that's also why many off-highway truck manufacturers have turned to pearlitic malleable castings—by National—for heavy duty parts. For truck builders know that pearlitic malleable has high ultimate strength . . . resists wear and fatigue under heavy loads and impacts.

And there are lots of other "plus" advantages in pearlitic malleable castings—from National. For example, they possess excellent non-seizing properties . . . can be either liquid or air-quenched . . . can be given a smooth finish. Perhaps *most important of all, pearlitic malleable machinability index ranges from 80 to 90* (B1112 steel=100).

Pearlitic malleable castings—from National—can often reduce manufacturing costs, weight and assembly time . . . can increase quality and sales potential of *your* product.

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The nation's largest independent producer of malleable and pearlitic malleable

Temperature conversion

Two-color temperature conversion chart not only converts degrees Fahrenheit to Centigrade or vice versa from minus 400 to plus 4000 degrees, but also shows the temperature ranges of various sensing elements — thermocouples, resistance bulbs and radiation heads. Maximum limits for both continuous and intermittent services are also shown. The table is printed on heavy, bristol-board-like stock, laminated for added protection and punched to fit three-ring loose-leaf binders. *Thermo Electric Co., Inc.*

For free copy circle No. 10 on postcard, p. 81

Equipment bulletin

Bulletin 855 itemizes a complete line of auxiliary equipment which includes bearings, takeups, holdbacks, chain, screen plates, pumps and valves. Also included is specification information on conveyor and drive pulleys, v-belt sheaves, sprockets, gears, shafts and keys. Complete descriptions of these items are given supplemented with photographs, dimension drawings, data tables and specifications. *McNally Pittsburg Mfg. Corp.*

For free copy circle No. 11 on postcard, p. 81

Die casting machine

Bulletin describing new Model 400-N die casting machine is now available. This machine, the bulletin states, while similar to the firm's Model 400, has been increased in rigidity and hydraulic capacity. As a result, it is reported, the machine is fast and can be furnished as either a cold chamber or hot chamber unit. Full 400 ton locking pressure has been strain gage tested. *Cleveland Automatic Machine Co.*

For free copy circle No. 12 on Postcard, p. 81

Liquid filter

Catalog SAK-057 describes a newly-designed, all metal, edge type, liquid filter reported as stopping micronic particles and being cleanable without interrupting flow. The booklet contains diagrams showing principles of operation and construction together with flow curves and specifications. *Cuno Eng. Corp.*

For free copy circle No. 13 on postcard, p. 81

this CINCINNATI PRESS BRAKE

is giving accurate and versatile performance at UNITED STEEL FABRICATORS, Inc.

With ample capacity, this powerful 500 Series Cincinnati Press Brake with 18" 6" clearance between housings and 22' die area—handles formed structural bridge flooring, guard rails, steel doors, Girders, and side walls for various types of metal buildings are also produced.

United Steel Fabricators, Inc. are pleased with the accuracy in forming and ease and speed of operation which are important factors in this economical production.

INVESTIGATE:

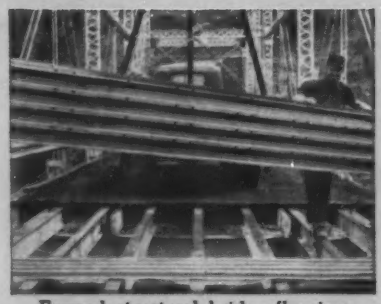
—Cincinnati Center Line Loading

—Cincinnati Interlocked Construction

—Cincinnati Rigid Deep Beds and Rams

Write for the latest Press Brake Catalog B-4.

Photos courtesy of United Steel Fabricators, Inc., Wooster, Ohio



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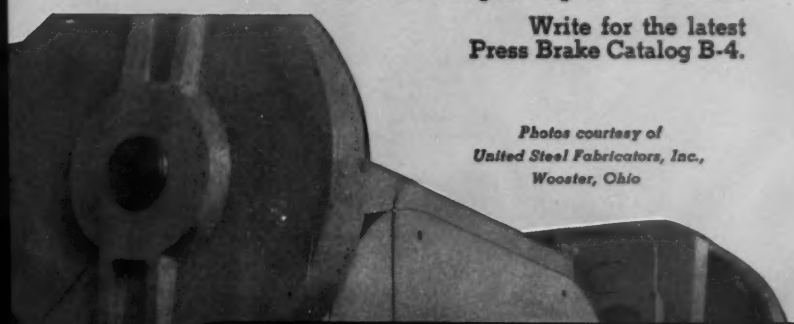

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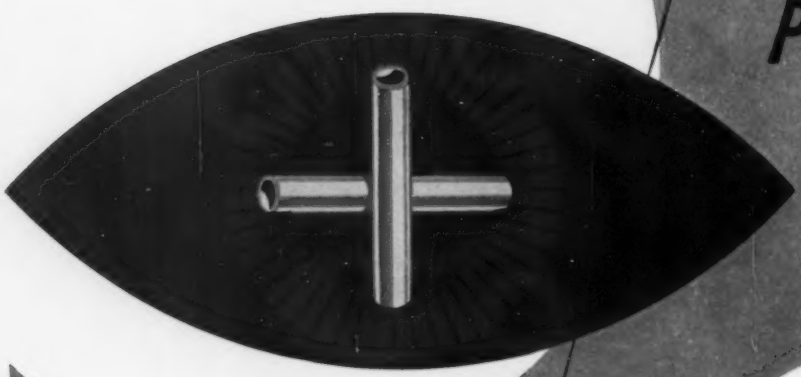

1 ***You'll see SPECIAL QUALITY Tubing*** that lets you turn hidden costs into extra profits. Ostuco's lightweight strength values, more uniform tube walls and fine finish result in seamless and electric resistance welded steel tubing of unmatched quality.

2 ***You'll see DESIGN-ENGINEERING SERVICE*** go to work on your tubing problems. A wealth of design and production information is at your service. Ostuco's experience dates from the beginning of the seamless tube industry.

3 ***You'll see ON-TIME DELIVERY*** of tubing as promised! No costly delays that hold up your production. Ostuco has the reputation of making deliveries on schedule.

4 ***You'll see "SINGLE-SOURCE" SERVICE*** in action and you benefit through convenient, error-free handling of the entire order! Manufacturing and fabrication is under one roof at Ostuco—one order eliminates multiple shipments, saves time and handling costs.

Some good things our customers are saying about OSTUCO:

Agricultural Equipment: *"Your Mill is doing an excellent job with regard to maintaining delivery promises."*

Hydraulic Equipment: *"We feel partial to you because of the excellent service."*

Machine Tools: *"You are receiving 100% of the tubing we purchase and will continue to do so as long as you keep up the good quality and service."*

Drilling Equipment: *"Your tubing is the best we've ever had because of its exceptional straightness and good workmanship."*

Blue chip companies, the world over, look to Ostuco for practical solutions to their steel tubing problems. Why don't you ask one of our Tubing Engineers to show you how OSTUCO'S PERFORMANCE PLUS service turns drawing-board ideas into top quality parts faster . . . more dependably . . . with greater savings.

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FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 76

Teflon products

Catalog T-55 is a 14-page publication about Teflon products such as tapes, sheets, rods, tubes, gaskets and fabricated specialties. The booklet gives general information about Teflon, describes its use as an insulator, its properties, and applications. *Continental - Diamond Fibre Div., Budd Co., Inc.*

For free copy circle No. 14 on postcard

U-clamps

Four-page data sheet gives information about a U-clamp molded of type FM-10001 Nylon which is described as withstanding continuous operation at 250°F. The clamp is mentioned as being a 2-piece assembly consisting of a U-shape and a keeper plate. The U-shape is serrated and designed for permanent attachment, while the keeper plate is pushed over the ends of the "U." It comes to rest in the proper position for retaining the wires firmly in place. To change, add or remove wires, the ends of the "U" are simply pressed toward each other and the keeper is removed. *Dakota Plastics Co.*

For free copy circle No. 15 on postcard

Can bodymaker

A bulletin just published describes one company's new No. 501 bodymaker and soldering machine. The 4-page bulletin gives complete details on design, construction and operating features. It also lists specifications such as body sizes, horsepower requirements and dimensions. This bodymaker is designed to operate at higher speeds; can produce bodies in a range of sizes from 2⅛ in. to 4¼ in. diam up to and including 5¾ in. high. *Baldwin-Lima-Hamilton Corp.*

For free copy circle No. 16 on postcard

Masking tape

Brochure No. P6-4 describes a new crepe paper masking tape of multiple uses. Manufactured by the Polyken "Controlled Strength" process of proper combination of adhesive and backing material. The product, No. 620, is mentioned as featuring clean removal, conformability to irregular surfaces, quick adhesion, easy unwind, and extreme thinness. It reportedly fits itself easily to curves, and the crepe backing gives the extra stretch needed on sharp angles. *Polyken Sales Div., Kendall Co.*

For free copy circle No. 17 on postcard

Tool steel chart

Tool steel brand chart, showing more than 300 varieties of tool steel lists carbon tool steels, shock resisting tool steels, oil and air hardening die steels, hot work tool steels, high speed tool steels and miscellaneous tool steels offered by twelve producers. *Vulcan Crucible Steel Co. Div., H. K. Porter Co., Inc.*

For free copy circle No. 18 on postcard

Piston inserts

"Keep Them Rolling," is a 4-page folder on piston groove inserts made of Ni-Resist austenitic iron. The folder explains what inserts are, how they increase efficiency and life of diesel engines. *International Nickel Co., Inc.*

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Copy grinding machine

Copy grinding machine is described in a new 4-page folder. The brochure describes the method used for grinding two duplicate lathe tools, form tools, thin profile gauges, or production parts simultaneously on a new copy grinding machine. *Carl Hirschmann Co., Inc.*

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Bearing adapters

Catalog No. 7 is a 64-page publication describing a line of precision bearing adapters which have been designed for use where vertical or horizontal complete shaft assemblies are required. They can also be used as a floating adapter to hold gear meshes to a minimum of backlash. Dowel holes are provided for spot drilling through, after setting for permanent positions. The units are mentioned as having been designed with a universal approach to use both plain or flanged ball bearings as desired. *Pic Design Corp.*

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Fuel gages

New booklet (Bulletin 546) covers capacitor type fuel gaging systems. The booklet describes true weight gaging systems, compensated and uncompensated capacitor type fuel gages, repeater indicators, fuel gage totalizing systems, selective indicators and thermistor applications for fuel level warning and control. *Liquidometer Corp.*

For free copy circle No. 22 on postcard

Switches

New 28-page bulletin, GEA-4746B, covers General Electric's line of control and transfer switches for low voltage applications up to 600 volts ac or dc. Publication includes photos, drawings, cutaways and discussion of special features. Switches with water-tight and explosion-proof housings are described. Bulletin also contains application data, representative contact, diagrams and ordering directions. *General Electric Co.*

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Snagging wheels

A new bulletin on snagging wheels describes the advantages of various types of construction of grinding wheels for use in steel mills, steel, malleable grey iron and nonferrous foundries. Also forge and metal fabricating shops. Both resinoid and vitrified wheels are included in this guide to metal removal. *Electro Refractories & Abrasives Corp.*

For free copy circle No. 24 on postcard

Collet selection guide

Complete collet selection guide for lathes, millers, grinders, and fixtures is presented in a new 4-page bulletin (No. 56). Specification and dimension charts, conversion and interchangeability listings, and prices are presented in simplified form for easy reference. Information on collets for nose type collet chucks is also given. *Hardinge Brothers, Inc.*

For free copy circle No. 25 on postcard

Wire wound resistors

Catalog data bulletin C-1a contains data on construction, features, types, ratings, terminations and leads, coating, insulation and winding of tubular and flat power wire wound resistors. Book is 12 pages and contains charts and graphs. *International Resistance Co.*

For free copy circle No. 26 on postcard

Control valves

Two new basic control regulating valves, reportedly having greater versatility and wider application, are described in Bulletin No. 1027. The bulletin states that the valves—diaphragm type, CV-D, and piston-type, CV-P—will handle water, steam, air, gas, oil or other similar fluids at unlimited pressures. A complete description of the valves is given, including the specifications for each valve and information on pressure reducing and desuperheating stations along with package controls. *Copes-Vulcan Div., Blaw-Knox Co.*

For free copy circle No. 27 on postcard

Motor graders

The design, engineering, construction and performance of a company line of 50 hp Model D motor graders is told in a new 16-page 2-color catalog (MS-459). Cut-aways, photographs of components, combustion graphs, and other illustrations are combined to help visualize features of both the gasoline and diesel engine Model D motor graders. Photographs show features for operator comfort and safety; matched attachments and accessories are included; and specifications of both gasoline and diesel engine models are included. *Allis-Chalmers Mfg. Co.*

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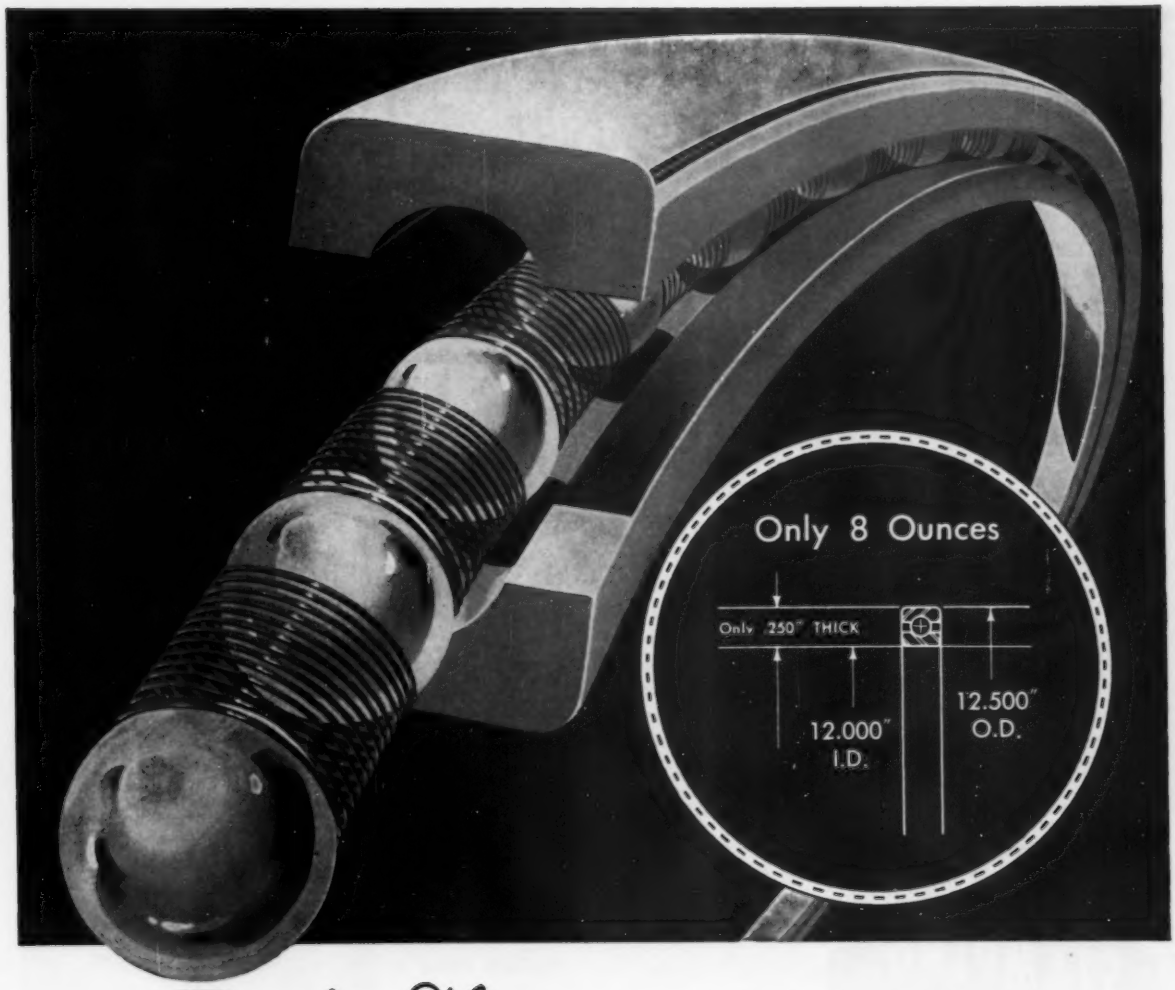

Reali-Slim... by Kaydon
world's thinnest radial ball bearing

HERE'S a typical example of Kaydon's *Reali-Slim* unique radial ball bearing that's finding wide application in practically every industry. *Reali-Slim* are the world's finest thin-section bearings and proportionately are thinner than a wedding ring. The bearing illustrated here is 12.000" I.D., 12.500" O.D., .250" thick — weighs less than 8 ounces. Designed for minimum weight and space limitations, it has a static load capacity of 5,520 lbs. and 894 lbs. at 100 rpm.

If you're looking for *Reali-Slim*, lightweight, radial ball or roller bearings, look at Kaydon's *Reali-Slim* line. Besides hundreds of standard *Reali-Slim* designs, there's a wide variety of special races, seals and separators to meet special bearing problems. What's more Kaydon is able to produce these *Reali-Slim*, high-precision bearings because Kaydon specializes in the unusual. In addition, Kaydon bearing engineers are prepared to give you valuable help with technical bearing application problems.

For complete data on *Reali-Slim* bearings for standard or special applications, ask for engineering Catalog No. 54RS-2.

***Reali-Slim* Ball Bearings** — in Conrad, angular contact, 4-point contact and other types are available in seven standard cross sections from .250" to 1" and in bore diameters from 4" to 40".

***Reali-Slim* Roller Bearings** — in radial or taper roller types are available in cross sections from 5/16" and in bore diameters from 5" to 40".

K-554

THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

All types of ball and roller bearings — 4" bore to 120" outside diameter . . .

Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Spherical Roller • Ball Radial • Ball Thrust Bearings

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HOUSEHOLD APPLIANCES
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RESEARCH: Test Friction Effect

Heat ovens and infra-red thermal lights help scientists investigate metallurgical effects of flight friction heat . . . Temperature differences maintained for extended time.

Scientists at Northrop Aircraft, Inc., Hawthorne, Calif., are using new types of resistance heat ovens and infra-red quartz thermal lights to investigate the metallurgical effects of flight friction heat.

The research men have found that while it is no problem to heat a component to any desired temperature, the real problem is in duplicating flight temperature distribution in a laboratory test.

As an instance they state that a high speed missile or rocket can conceivably leave an earth temperature of 70°F and within seconds achieve skin temperatures of 300° or more depending on the vehicle's speed.

In their experimentation they developed one type of furnace called a stabilized temperature oven to achieve very close control of intermediate temperatures.

Savings Cited

It incorporates means for inducing temperature differences in a typical specimen which can be maintained for extended periods of time. Northrop engineers point out that a component does not reach desired temperature distribution instantly and some components must be given a soaking process up two or three hours before tests can be conducted.

The work being accomplished with the new equipment has resulted in substantial savings in engineering man hours and in methods of manufacture.

In one application, structures research engineers found that an experimental skin panel buckled due to heat induced stresses. The condition was corrected through use of a honeycomb core which stabilized the skins. The new construction is cheaper on a volume basis than the original method, it is lighter, and flight efficiency has been considerably increased.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 81. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Stabilized temperature oven measures thermal stress.

Extremely high temperature evaluations are also being conducted at Northrop. Some investigations of titanium entail temperatures of 1000°F or up. Other experiments with infra-red develop enough heat to melt metals within five seconds of the time the heat is applied.

Testing:

Movies taken inside pipe check chain-reactor tube.

By taking movies of the inside of a pipe, General Electric Co. engineers at the Hanford atomic

plant, operated by G.E. for the Atomic Energy Commission, are checking for damage which could be caused inside aluminum tubes which normally hold uranium fuel in chain-reaction reactors.

Wide-angle lens aids in checking tube for damage.

As shown, the long telescope attached to the movie camera is equipped with an extremely wide-angle (120°) lens at the far end and additional lenses along its length. As it moves through the tube, the telescope projects a traveling image of the tube interior upon successive frames of movie film.

Watching this film projected on a screen gives the viewer about the same visual effect as is obtained while driving through the Holland Tunnel.

Any damage present is clearly visible on the screen.

Forming:

Tubing is expanded, sized in assemblies up to 72 in. long

A new type of air conditioning coil expanding machine is described as expanding and sizing copper tubing in evaporator and condenser finned coil assemblies up to 72-in. long, according to the builder, Walter P. Hill, Inc., Detroit. The machine, stated to be the largest of its type ever built, is the first of a new line of inclined frame tube expanding machines. It utilizes hydraulic power to expand the condenser tubes and size the ends for soldered return bends by forcing expansion mandrels through the tubes.

An inclined frame 144-mandrel tube expander, for example, handles coil assemblies from 18-in. to

The Spray Booth Floor Grating That Cleans Itself . . .
engineered by PLANET

At a leading automobile plant, Planet Corporation has designed and installed a 3,400 foot multi-story dragline. It moves auto bodies through a series of lacquer spray booths, and then through drying ovens to the trim line for trim, upholstering, and glass.

Before this installation, the floor grating in the spray booths had to be removed frequently for cleaning because of lacquer accumulation.

Now, the grids are self-cleaning. They move at a rate of a few inches per minute, passing through a series of cleaning tanks under the floor.

The Planet solution to this problem has resulted in a substantial savings in cost and time.

An automatic system of this kind is just one of many ways Planet engineers can help you solve your particular materials handling problem. Their experience and know-how is available, without obligation. Write today.

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GISHOLT MASTERLINE NO. 12
AUTOMATIC PRODUCTION LATHE

MASTERLINE
GISHOLT SINCE 1887

Sixty-nine years of machine tool experience have gone into this latest design of the Gisholt MASTERLINE No. 12 Automatic Production Lathe. An important contribution to metal-cutting progress, it is ready to produce faster, better and at lower cost—with even less requirements for operator skill and effort. May we tell you the complete facts about it—and how it may be profitably applied to your manufacturing processes?

Gisholt Machine Company, Madison 10, Wisconsin

Look ahead—keep ahead—with Gisholt

EVEN if the cost per piece is actually higher, if the gears you use in your product are precision-engineered by Perkins, the *heart* of your product — its power transmission system — will function more efficiently. This factor is especially valuable when automation enters the production picture. In that case, *lack of functional precision,* could easily result in speeding up the manufacture of faulty products — a truly horrendous possibility.

Figured on the basis of trouble-free performance alone, the ultimate cost of Perkins Gears is considerably lower than their initial cost-per-piece would indicate. Best of all, even the initial cost of Perkins custom-made Gears may be competitive. And that is something you can quickly and easily determine by asking us to quote on your requirements.

PERKINS MAKES:

to customers' specifications, in all materials, metallic and non-metallic: bevel gears, ratchets, sprockets, ground thread worms, spiral gears, helical gears, spur gears with shaved or ground teeth.

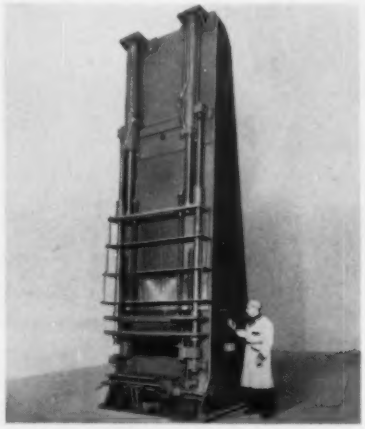
NOTE: The PERKINS PRECISION SPRING COILER is the latest development in the spring coiler field and eliminates entirely the use of arbors and long set-up time. It is a complete self-sufficient machine and enables you to make the spring you want when you want it — in seconds. The coiler produces any type of spring, in any diameter and any pitch with this range: Wire sizes .005 to .125. Diameter, from 3/32" to 12" and larger. Size of the compact coiler is only 7 1/2x16". A POWER MODEL is available. Information on request.

PERKINS MACHINE & GEAR CO.
103 Circuit Ave., WEST SPRINGFIELD, MASSACHUSETTS

72-in. long. Tubing up to ½-in. diam and 0.020-in. wall thickness can be expanded by the machine which features a hydraulically-controlled, tilting work fixture.

How Machine Operates

A finned coil assembly, in which the copper tubes are to be expanded and sized, is placed in the work fixture on the machine. This fixture is tilted out towards the operator. Then a fixture control valve is operated. The fixture is closed by a 3-in. diam hydraulic cylinder. Then a stripper plate controlled by two other 3-in. diam hydraulic cylinders lowers, thus locking the fixture in place.

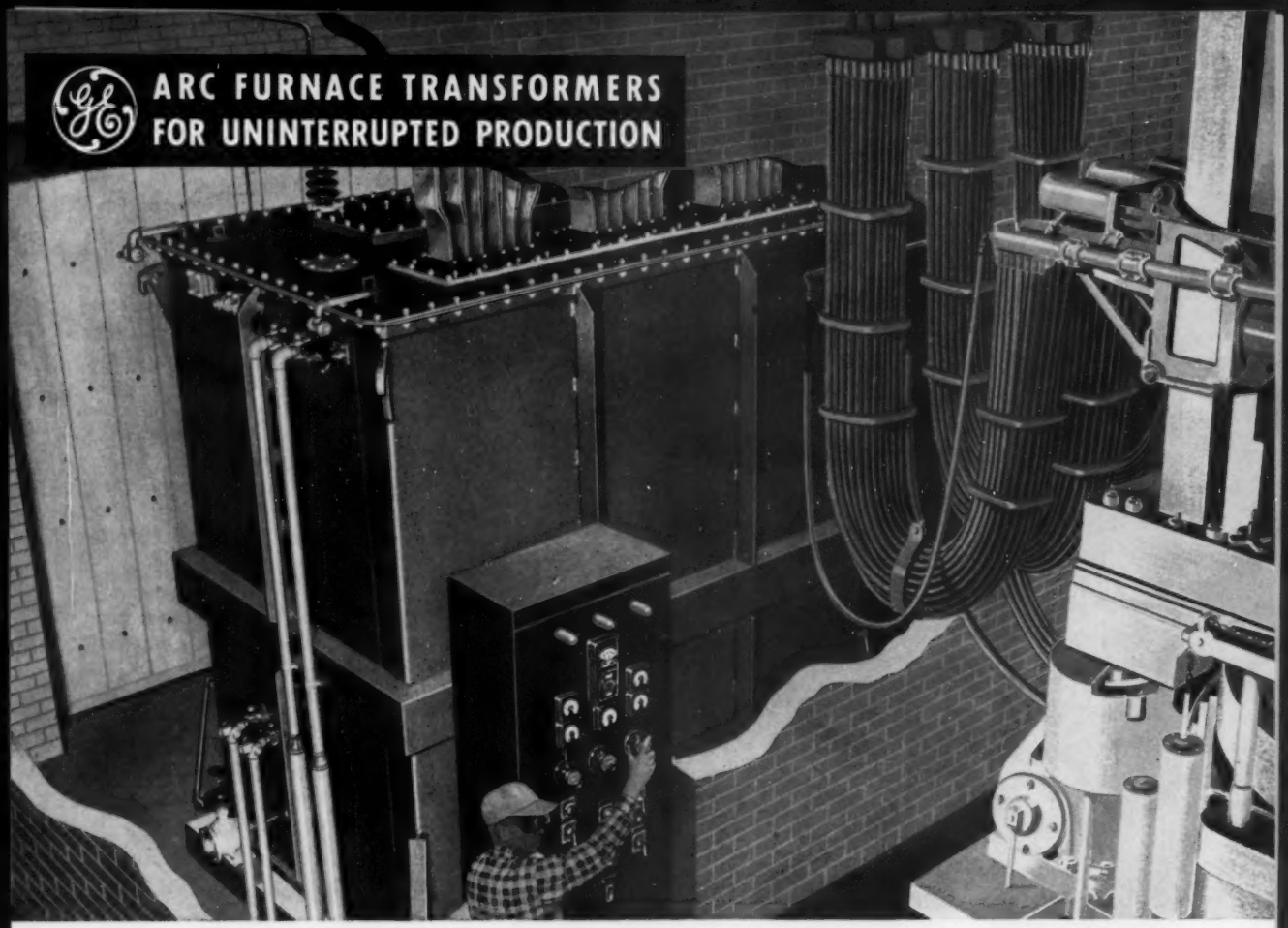


Unit expands and sizes tube to 72 in. long in 15 seconds.

A second valve control is operated which causes the two 6-in. diam main hydraulic control cylinders to move the long expansion mandrels down through the sizing mandrels into the tubes.

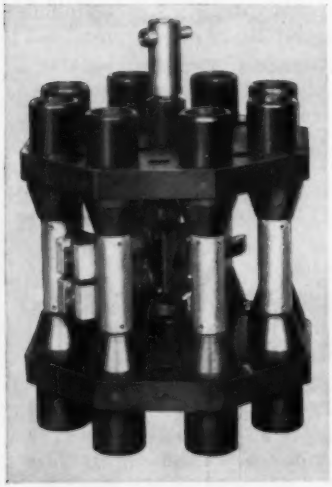
Near the end of the stroke, the expansion mandrel support plate contacts the plate supporting the sizing mandrels; causing them to enter the tube ends and expanding them to receive soldered return bend fittings. At the end of the stroke, the mandrels automatically retract, stripping the coil against the stripper plate and returning to start position.

The fixture control is again operated, causing the stripper plate to raise and the fixture to open for the unloading of the finish expanded and sized finned coil assembly.



YOU CAN COUNT ON PRODUCTION CONTINUITY WHEN YOU INSTALL A GENERAL ELECTRIC ARC FURNACE TRANSFORMER.

Not one G-E tap-changer contact failure since wedge-type introduction in 1938



HEART OF TAP-CHANGER mechanism is the circular arrangement of contacts. Made of specially tin-plated copper, they have high current-carrying ability with low contact temperature, and a wedging action which assures good contact under all operating conditions.

Since the introduction 18 years ago of the General Electric wedge-type tap changer, no contacts have ever separated, carbonized, welded, or otherwise failed according to our records. This is another example of the outstanding record of reliability established by G-E arc-furnace transformers.

The tap changer itself is designed with liberal electrical, mechanical, and thermal safety factors. It can, in fact, withstand the full short-circuit current of the transformer without injury. Furthermore, a special safety interlock between tap-changer driving mechanism and primary circuit breaker prevents any chance of tap-changer operation under load. Because of the tap changer's reliability, it can be strategically located in the main tank close to the windings, thus permitting great savings in floor area.

Tap changers are only one of many features which make G-E arc furnace transformers your best bet for long-term reliability. Others include core-type construction with inherently strong circular-concentric windings, dust-tight bus-bar seal, and high-pressure-tested cooling systems.

For complete details contact your nearest G-E apparatus Sales Office or write for Bulletin GEA-6236 to General Electric Company, Section 422–27, Schenectady 5, New York.

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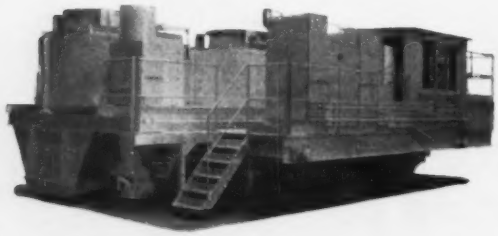
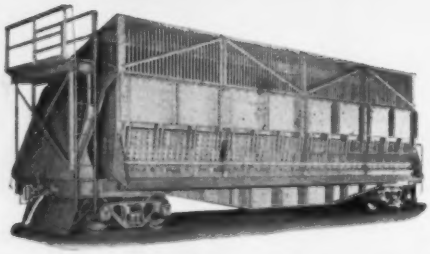
COAL TO COKE VIA ATLAS CARS

Making coke is a specialized business, and requires special equipment like the cars below. Coke plant operators prefer Atlas Cars because they are dependable.

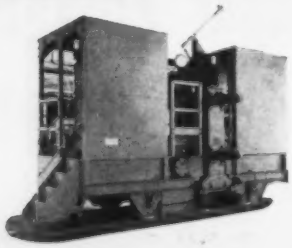
3 HOPPER COAL CHARGING CAR



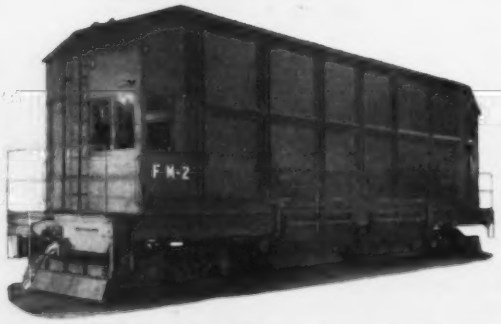
COKE QUENCHER



HYDRAULIC DOOR MACHINE



40-TON COKE TRANSFER CAR



THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

Rolling:

Electric controller surface measures coil or rolls

Methods for the measuring of coiled or roll formed metals usually utilize a positive stop or limit switch trip, gear rack and pinion, or a traveler block screw setup. All of these methods, states the Dahlstrom Machine Works, Inc., Chicago, have definite limitations, such as: excessive down time for changeover, minimum and maximum length restrictions, and accumulation of error.

This firm say they have recently developed and proved a method of lineal surface measurement thereby giving industry facilities such as: instantaneous changeover as to length requirements, elimination of accumulated error and minimum and maximum length restrictions and the usual troubles caused when running the lighter gages.

Use Specialized Controller

The method of surface measuring is accomplished by utilizing an electrical measuring controller specially manufactured by Berkeley Division of The Beckman Instruments, Inc., of Richmond, California. These measuring controllers are furnished as a single pre-set or dual pre-set unit, depending upon the line requirement. Should only one signal be required such as for a continuous running decoiling and shearing line or a roll forming line, then a single pre-set counter is used which would develop the final signal for the clamping and shearing cycle.

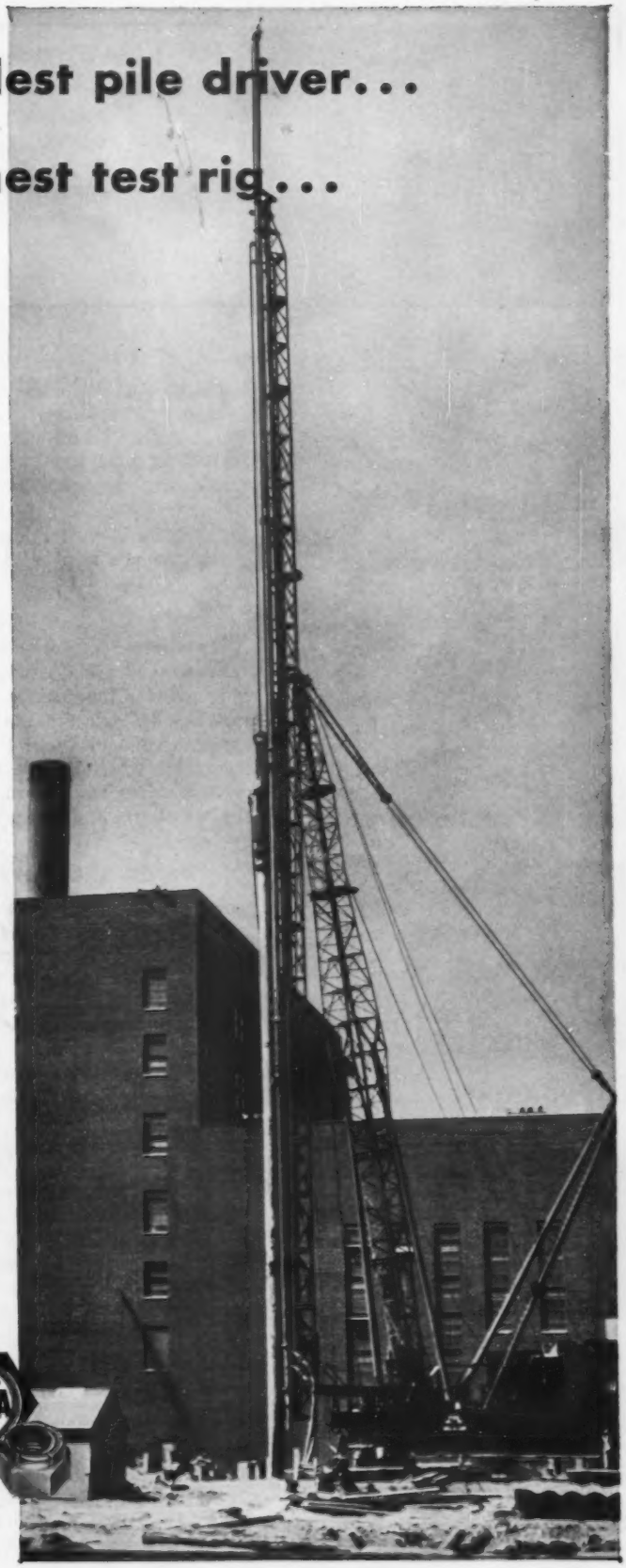
Should two signals be required such as for a roll feeding line which would involve a start and stop cycle, then a dual pre-set counter is used. One signal would be utilized for the slow down action and the second signal for the final stopping action. For roll feed or decoiling and shearing lines two signals are sometimes needed when running on the "hop," then a dual pre-set counter is used.

World's tallest pile driver...

World's toughest test rig...

for

Elastic Stop® nuts



Each hammer-stroke of this 270-foot pile driver delivers a 24-foot-ton wallop! It was built by Raymond Concrete Pile Company to drive 200-foot pipe piles for the foundation of units being added to the B. C. Cobb Steam Plant of Consumers Power Company, at Muskegon, Mich.

Raymond makes a practice of using Elastic Stop® nuts for bolting together sections of leads and booms on all their pile-driving equipment. The red elastic locking collar of these vibration-proof fasteners has successfully maintained its grip under these severest of all vibration and impact conditions!

Whether used on aircraft or locomotives; guided missiles or steam shovels . . . more than twenty years of field testing on applications where safety and severe operating conditions demand a fastener that will not shake loose, prove that . . . *you can rely on Elastic Stop nuts.*

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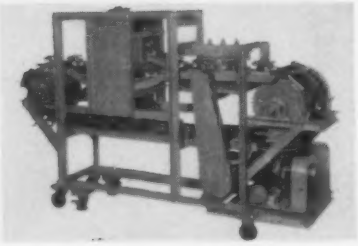
The red locking insert in an Elastic Stop nut guarantees

- reusability
- vibration-proof locking
- thread sealing . . . no galling
- immediate identification
- adaptability to all shapes and sizes of threaded fittings
- suitability to production line assembly methods

NEW EQUIPMENT

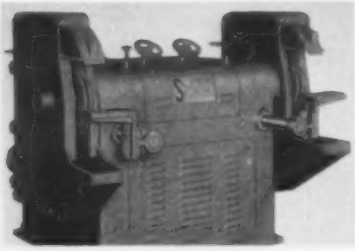
New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 81 or 82.



Unit cuts tube, delivers 720 pieces every hour

A tubing cutter and conveyor consists of an automatic sawing and deburring unit with built-in conveyors for the fast handling of the tubing. It is described as handling tubing up to 1½ in. in diam and up to 0.050 in. in wall thickness. All operations are mentioned as fully automatic. The unit photographed is used for cutting and deburring brass tubing. On this application it reportedly cuts the tubing at a 30° angle, and delivers 720 completed pieces every hour with no scrap. *Cooney Industries.*

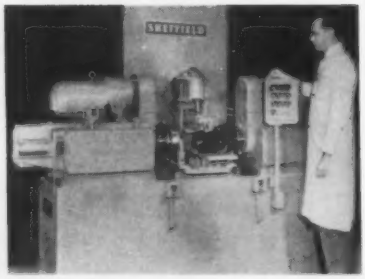
For more data circle No. 29 on postcard, p. 81



Snagging grinders feature safety interlock

A twin-motor double-end grinder (shown) and a single wheel snagging grinder incorporate a safety interlock to maintain exactly 9000 sfpm throughout wheel life. This allows the wheel to have the same cutting action when worn as when the wheel was first mounted. The double-end grinder is a 2-in-1 machine with each side entirely independent and each wheel operated at its own correct, efficient speed, irrespective of wheel diam. Speed change made while unit is running. *Standard Electrical Tool Co.*

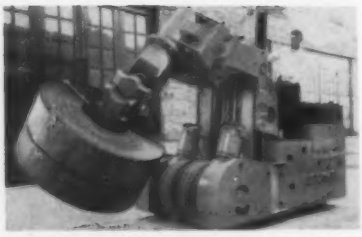
For more data circle No. 30 on postcard, p. 81



Bores, chamfers, faces and threads 60 parts per hr

This new double-end machine reportedly bores, chamfers, faces and threads both ends of a gate valve body within 2 in. to 6 in. pipe size at the rate of 60 parts per hr. including loading and unloading. It consists of two threading and boring units and an air operated work positioner and clamping device mounted on a common base. This threading unit has a precision lead screw and hydraulic feed for boring and facing. It is powered by a 5-hp motor and has a gear type, 4-speed transmission drive. Machine is 8 ft long x 3 ft wide and 5 ft high. *Sheffield Corp.*

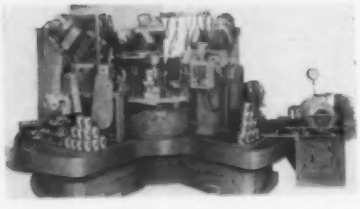
For more data circle No. 31 on postcard, p. 81



Truck attachment picks up, rotates steel coil

The introduction of a heavy ram truck attachment which can pick up a 60,000 lb steel coil in either a vertical or horizontal position and rotate it to the opposite position has been announced. All operating controls are located in the operator's position. The attachment may be removed for installation of forks or ram. It handles coils up to 60,000 lb in weight. Clamp is said not to distort or damage coil. *Automatic Transportation Co.*

For more data circle No. 32 on postcard, p. 81



Driller performs 10 separate operations

During each complete cycle of this machine it performs 10 separate operations on a piston. It finish drills 4 angular holes; and finish drills 6 horizontal smoke holes. The unit, which will drill 1200 pistons per hr, is an 8-station, horizontal and angular, dial-type machine. It features an automatic index table and indexing fixtures. *Michigan Drill Head Co.*

For more data circle No. 33 on postcard, p. 81

"...and then they put that hot bar of metal between the upper die and the lower die and.....WHAM!"

Look who's showing off! Well, he doesn't know everything—yet! But he sure has learned something about his old man's forging business from that color booklet in his back pocket.

It's called "Forgeland, U.S.A."—an interesting, instructive book about *your* business and *ours*, written in *his* language and with pictures, too! We've prepared it here at Erie, because we think it's nice for Pop to be a hero in his own home—and we're all for encouraging it.

To quote your beloved smart-aleck, "Aw c'mon Dad, get me the book will yuh, huh, please, huh, please—it's for FREE, anyhow . . . not even any box tops or hammerscale to send in!"

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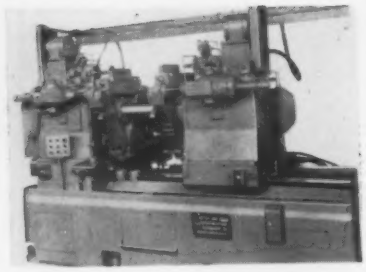
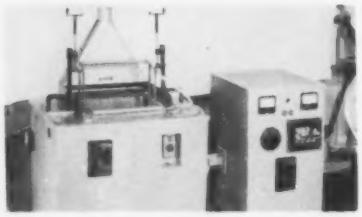


New milling and centering machine announced

This is a universal, production type machine, designed to meet the accuracy and production demands of tracer-controlled and automatic lathes. It is described as quickly set up for lengths up to 48 in. and drills to a depth of 4 in. if desired. Two triangular fixtures with six trunnion vises index 120° between three stations. Station one is for loading and unloading. At a second station, double-end center drilling takes place. These three operations (load-unload, mill and center drill) are simultaneous and take place in the order in which listed. *Motch & Merryweather Machinery Co.*

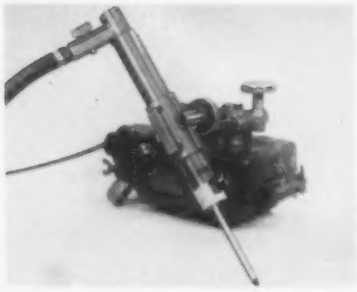
For more data circle No. 34 on postcard, p. 81



Accurate control of bath featured on chromeplater

A new, large capacity chromeplating unit is especially designed to plate large size metal forming and plastic molding dies as well as engraving plates and heavy shafts. The unit has a plating tank 15 in. x 20 in. x 30 in. deep. It is equipped with two 3000 watt electric immersion heaters and a heavy gage steel water jacket providing control of plating bath through adjustable thermostatic temperature control. *Dawson Corp.*

For more data circle No. 35 on postcard, p. 81



Automatic travel torch makes smooth cuts

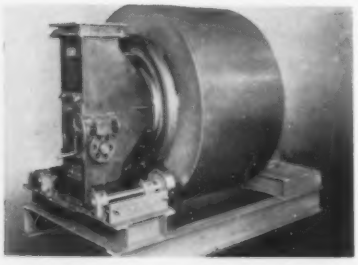
This new model L-3 automatic travel torch is described as making gouges as smooth as those cut by machine operation. It complements the manual models of this unit which are still recommended for operations where the premium is on flexibility and versatility. The new model is designed for applications requiring long gouges, cuts or bevels; and where there are no intricate configurations or complicated lines of travel. It is positively held and moved by a machine on a track. On circumferential seams it is held in a fixture with the work rotated. Speed of travel can be pre-determined and set at constant rate. *Arcair Co.*

For more data circle No. 36 on postcard, p. 81

New hand unit for quick scanning of microfilm

Announcement has been made of the availability of a new hand unit for the quick scanning of microfilm in aperture cards. Known as the Filmsort Micro-Midget, Model MG, the unit is reported as being capable of use in any light. Aperture cards, jackets or unmounted film are simply slipped into a slot under the optical lens. The unit weighs 5 oz and fits readily into an ordinary pocket. It is described as affording a 4 times magnification. Lens diam is 12.69 mm. *Filmsort Div., Dexter Folder Co.*

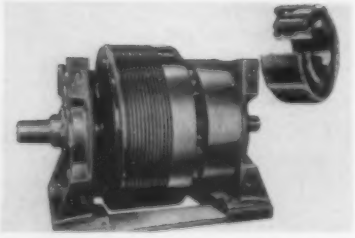
For more data circle No. 37 on postcard, p. 81



Monel blender used in mixing of bulk solids

Described as marking the first time that Monel has been utilized in this type of blender, an all-Monel unit is used for the dry blending of bulk solids. With a capacity of 1000 lb per batch, the blender is described as incorporating corrosion resistance and the ability to handle abrasive materials. In addition, the following points are cited in its favor: Both intake and discharge at same end of machine; a 4-way mixing action; and "open-door" construction for easy accessibility. *Sturtevant Mill Co.*

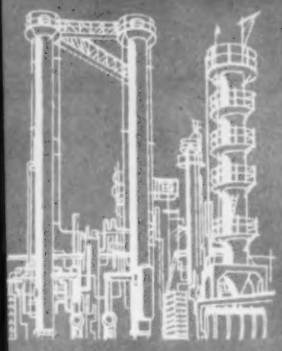
For more data circle No. 38 on postcard, p. 81



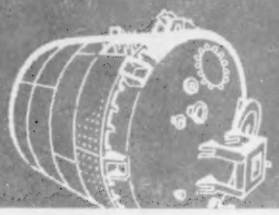
Press drive bearing has separable outer race

This double width radial roller bearing, which features separable outer race, bronze retainer and crowned rollers, is said to support the 3500 lb flywheel of this 30-in series press drive up to 550 rpm. The bearing is constructed to enable the inner race and roller assembly to float in the outer race. Since the outer race is separable, the press drive shaft can be withdrawn with reported ease. *Rollway Bearing Co.*

For more data circle No. 39 on postcard, p. 81



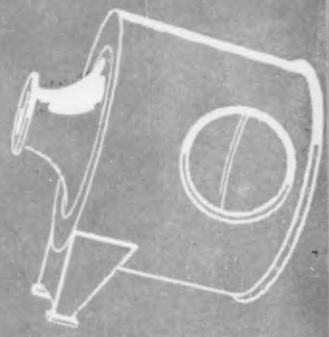
McGREGOR-MICHIGAN corporation

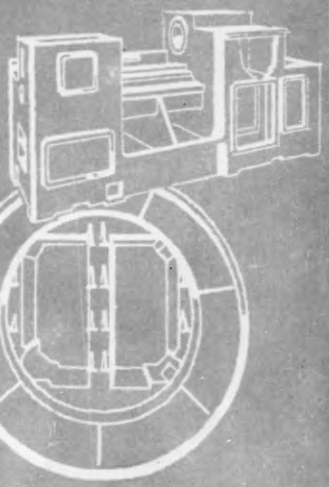


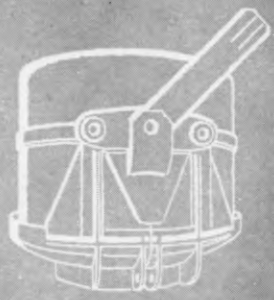
a new name FOR AN old service

A century is a long, long time. Yet for well over 100 years we have supplied industry with heavy steel plate fabrications. Originally this included power plant boiler construction and maintenance, so our old name, Central Boiler & Mfg. Co., was once appropriate. But for many years that name put us in a niche which we had outgrown. We have not *built* a boiler in scores of years, while we have constructed steel mill equipment, chemical and petroleum processing equipment, machine bases, diesel engine beds, heat exchangers, stacks and other mild and stainless steel plate fabrications. Our steel plate warehousing service is growing; power plant maintenance still remains a valuable part of our business, but we can't be "typed" by our name.

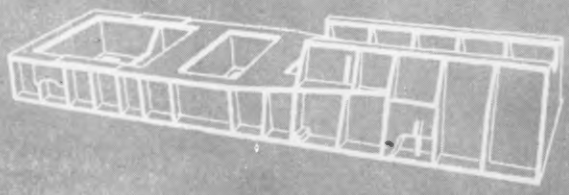
The fourth generation of McGregors has directed the Corporation for ten years. It has grown in size and versatility. Our heavy bending, forming, cutting and joining equipment is the newest and best. Some of it is especially designed and built by us to do jobs only a few fabricators are able or willing to tackle. The McGregor policy is one of uninterrupted progress, the combining of better thinking and better tools in order to produce the more durable, more efficient equipment your problem requires. It's a policy which leads to diversification of services, to customer satisfaction and, inevitably, to growth. We're confident you'll hear our name occasionally in the future—and we hope that your future and ours cross frequently.







For a detailed description of some of our activities, send for our 8-page illustrated brochure.



McGREGOR–MICHIGAN CORPORATION

5819 RIVARD ST. • DETROIT 11, MICHIGAN • TRINITY 2-2400

HEAVY STEEL PLATE FABRICATION AND WAREHOUSING

COWLES

TRIMMING KNIVES

produce more tonnage per grind

Cowles knives stay on the job longer. They keep mills in continuous production without downtime for knife changes. Manufactured from individually hammered forgings, and heat treated to assure maximum durability, they meet industry's most exacting requirements. Complete range of sizes. **Prompt delivery.** Widely used by all principal producers and processors. Let us quote on your requirements!

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TOOL COMPANY
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Specializing in the Manufacture of

ROTARY SLITTING KNIVES • SPACING COLLARS • GANG TOOLS • EDGING ROLLS • CUT-OFF KNIVES • SEAM GUIDE ROLL FINS • SEAM GUIDES • WIRE DRAWING TOOLS • STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.

DEPENDABLE
QUALITY • PRICE • SERVICE

Electro-manganese 99.9+%

STANDARD OF THE WORLD FOR PURITY
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ALSO AVAILABLE

Nitrelmang

A Stable Nitrided ELECTROMANGANESE

Both made by the pioneer producer of electrolytic manganese.

Write for Booklet

Electro Manganese CORPORATION

BOX 479 • KNOXVILLE, TENNESSEE

STAMPINGS *for the* FINISHED PRODUCT

SEE SESSIONS . . . for Metal Specialties, Box & Case Hardware, Stamped Assemblies in a wide range of finishes.

J. H. SESSIONS & SON

290 RIVERSIDE AVENUE • BRISTOL, CONN.

Flame cut-off machine

This machine has been designed to perform straight cut-off and beveling operations on medium and large diameter bar stock and pipe. For pipe cut-off operations, the torch is mounted radially and describes a complete revolution about the

work. For bar stock cutting, a secant action of the torch is used, with the torch head describing only part of a revolution. Limit switch stops rotation. *Speedi-Burn Products Co., Inc.*

For more data circle No. 40 on postcard, p. 81

Filtration unit

Described as completely automatic and self-cleaning, a new filtration unit is designed for use on grinders, hones and other machine tools where continuous and effective filtration of coolants is desired. It

employs vacuum as an operating medium and, the maker states, is capable of delivering high flow rates in sustained operation. *U. S. Hoffman Machinery Corp.*

For more data circle No. 41 on postcard, p. 81

Socket screw

New "Saf-lok" socket screw, featuring an expansion insert, is manufactured in a complete line of socket shoulder screws (stripper bolts) and flat head socket screws as well as cap screws. It is described as never vibrating or shaking loose when drawn up tight. This, the maker states, makes it an ideal fastener where motion or movement is an important factor. Also described as leakproof. *Safety Socket Screw Co.*

For more data circle No. 42 on postcard, p. 81

McKay's *Flex-Roll Processor*

Conditions steel prior to fabricating to eliminate stretcher strain, minimize tearing

THE NATION'S foremost metal fabricators, including all the leading automotive manufacturers, have proved the McKay Flex-Roll Processor to be the finest equipment of its kind available to industry today.

If you are doing any amount of deep drawing, you cannot afford to be without the services of this amazing unit. Let our sales engineers put you in contact with a user in your area . . . a few minutes of your time will convince you of its value. ***The McKay Machine Company, Youngstown, Ohio.***

McK

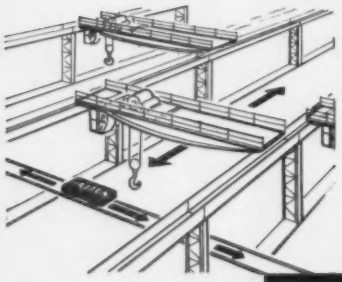
SETTING THE STANDARDS OF QUALITY IN METAL WORKING MACHINES FOR TWO GENERATIONS

9902

New CROSS-BAY®

GASOLINE-HYDRAULIC TRANSFER CAR

to supplement overhead crane service in multiple bay plants, and for handling between plant buildings or storage and shipping areas,



CUSTOM-BUILT to meet speed and capacity requirements. Special superstructures can be designed for specialized or mechanized handling. The car illustrated, built for steel warehouse work, provides capacity of 25 tons plus 50% for impact loading, and two-way speed of 50 feet per minute. Other capacities available.

A-1048

CROSS-BAY cars may also be powered by electric motor, electro-fluid drive, gasoline-electric drive, or storage battery. Capacities from 5 to 500 tons. Custom-built.

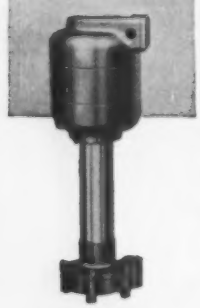
EASTON®

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

Most Versatile

Ruthman

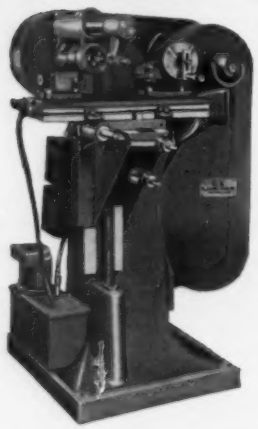
GUSHER Coolant Pumps



MODEL UL 7120

Popular Model proved in performance by many leading machine tool builders

Gusher Coolant Pumps are available in a wide variety of models to fit almost any requirement. You can choose from immersed, pipe connected, and flange mounted for external or internal discharge in either motor or belt driven types. Tank mounted models for portable use are also available.



This United States #1 Hand Milling Machine manufactured by U. S. Burke Machine Tool Co. is equipped with a Gusher Coolant Pump.

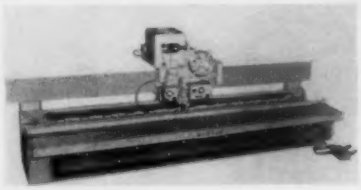
Ruthman centrifugal pumps are also available as circulators, agitators, molten metal pumps. Write us your requirements. We will be glad to furnish you further information.

THE RUTHMAN MACHINERY CO.

1809-1823 READING RD. CINCINNATI 2, OHIO

Automatic arc welder

This stake welding machine is designed for the automatic arc welding of flat stock. It includes side loading platforms with ball transfer rolls to aid in material handling.



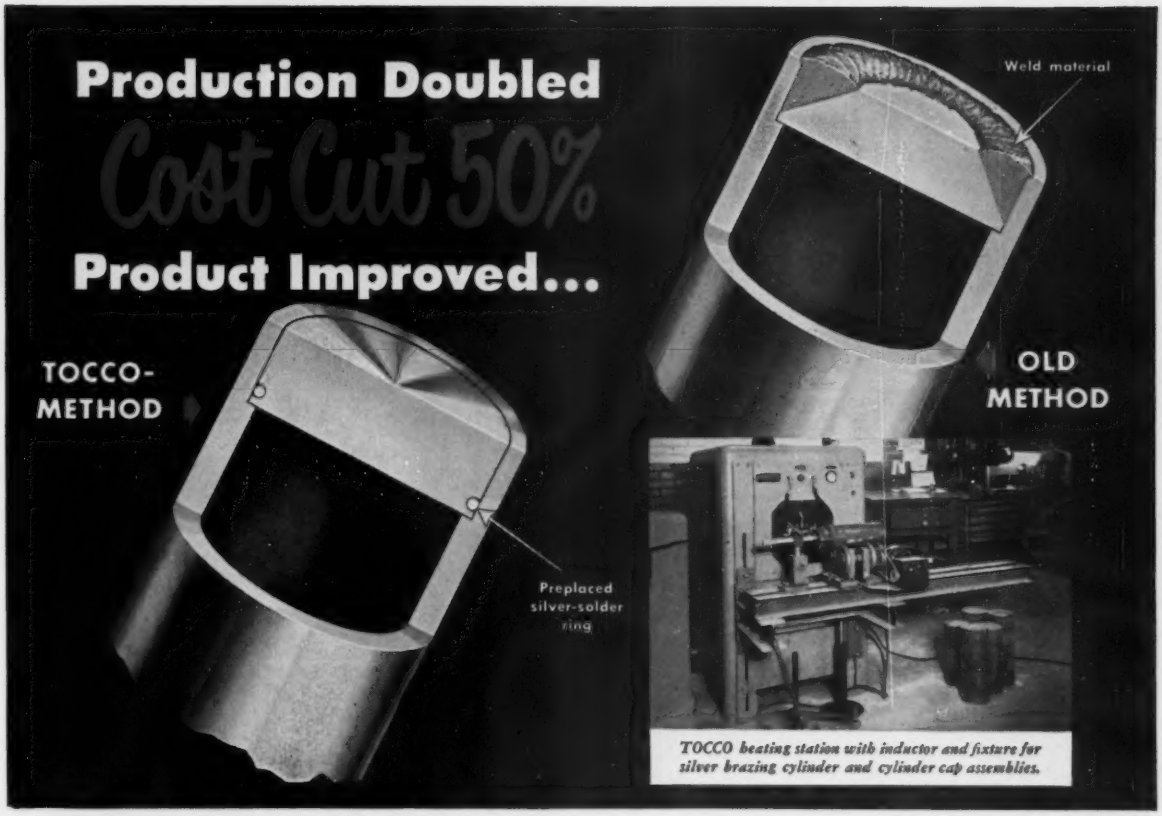
The machine is described as handling flat stock of all types up to ¼ in. in thickness. Features included are positive clamping, accurate gaging, and water-cooled back up bar. *Morton Mfg. Co.*

For more data circle No. 43 on postcard, p. 81

One-ton multipress

A new one-ton multipress is described as featuring: Duplicated ram pressure on every stroke, precision ram alignment, fast cycle time, easy setup, ample daylight to adapt tooling and interlocked manual controls to eliminate accidental tripping of ram. It is recommended for assembling, riveting, punching, marking, trimming, pelleting, compacting, testing, straightening, broaching and swagging. Its hydraulic system is a single power unit which can be removed and replaced in a few minutes. The unit, with a ram pressure of 500 to 2000 lb, is electrically controlled. It weighs 225 lb. *Denison Engineering Co.*

For more data circle No. 44 on postcard, p. 81



with TOCCO* Induction Heating

The experience of The Commercial Shearing and Stamping Company, who use TOCCO for silver-brazing hydraulic cylinder assemblies, is typical of the benefits obtained by America's leading metal-working plants who use TOCCO Induction Heating for brazing, hardening, heat-treating, forging and melting operations.

More Production with TOCCO

a. Heating time per piece cut from 15.3 minutes to 2 minutes on 5¼" I.D. cylinder.

b. Machining and cleaning operations, formerly required, are not needed after TOCCO brazing.

Lower Costs with TOCCO

a. Through a reduction in time required for each piece.

b. Through the elimination of scrap and reworks.

c. Because, since TOCCO is automatic, operator need not be trained or especially skilled.

Improved Product with TOCCO

a. Because of better looks and sales appeal.

b. Because distortion is minimized.

c. Because of elimination of field failures due to severe stress pockets.

TOCCO Engineers — can probably find applications in your plant, too, where TOCCO Induction Heating can increase output, cut unit costs and improve your product. Such a survey costs you nothing—and may save you a great deal.

THE OHIO CRANKSHAFT COMPANY

TOCCO

Mail Coupon Today

NEW **FREE** BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. A-3, Cleveland 1, Ohio

Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering."

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Company_____

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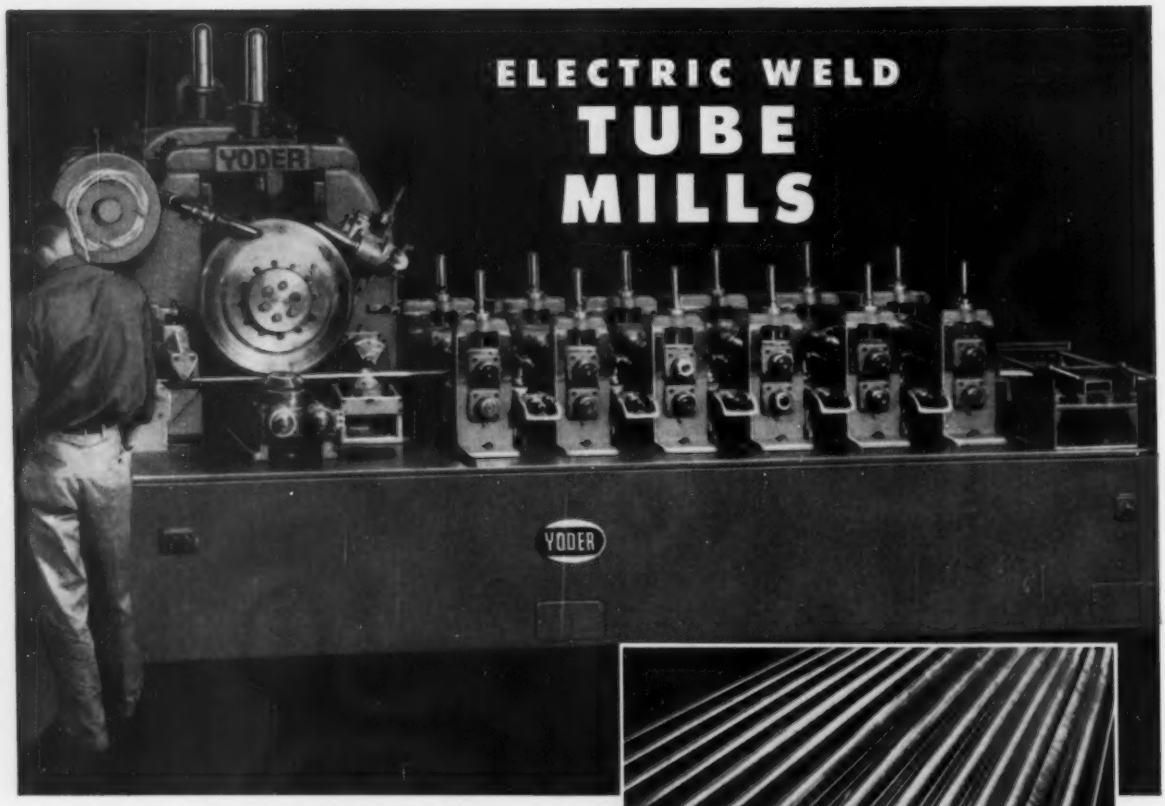


The photo shows the tube forming mill and welder of a complete Yoder mill recently installed for an Italian customer. Although it looks very much like a standard Yoder mill, it embodies special mechanical and electrical innovations designed for *tube production at speeds up to 350 fpm*—from 200 to 300% faster than heretofore considered practical by the resistance-weld process.

This is just one example of the many new things introduced by Yoder in pipe and tube making equipment, to meet widely varying production needs. Other recent Yoder developments are induction weld mills for making steel as well as nonferrous pipe and tubing, at speeds never before approached by this process, and adding greatly to its recognized economic advantages.

For more complete information about the latest technological advances in Yoder tube mill equipment, write, wire or phone

THE YODER COMPANY

5510 Walworth Ave. • Cleveland 2, Ohio

Literature on Request:

- ☐ **1.** Electric Weld Tube Mills for *Steel Tubes* up to 4" diameter.
- ☐ **2.** *Induction Weld* Tube Mills—sizes up to 8" diameter for aluminum, nickel, copper, brass, inconel, monel, stainless and other alloys.
- ☐ **3.** *Pipe Mills*—electric weld—for sizes up to 24" diameter.

ENGINEERING YODER MANUFACTURING

PIPE AND TUBE MILLS—Electric Weld

ROTARY SLITTING LINES

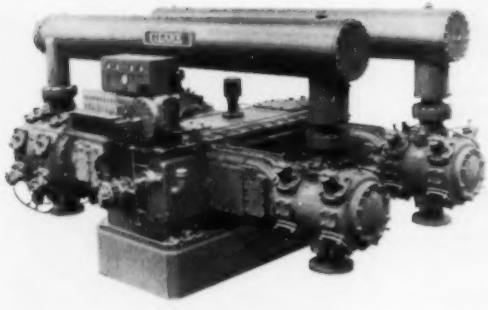
COLD ROLL FORMING MACHINES

any flat means trouble

but in plant air supply
it also means lost production!

Unless your plant air supply has adequate capacity in reserve, you may actually slow down your entire production every time you add a new labor-saving air-operated tool or device.

New increased demands on overloaded or overextended air supply inevitably cause a pressure drop all along the line. That means every tool, chuck and wrench slows down . . . and production suffers.



When did you last check your air at the *end* of the line? If it is going "flat," a Clark Balanced/Opposed Air Compressor will restore full pressure and, at the same time, *provide for a planned reserve to take care of future demand.*

There is a Clark Representative near you ready to give you all the facts. Why not call him now or write for your copy of Bulletin 118?

CLARK BROS. CO., OLEAN, N. Y.
One of the Dresser Industries
Offices in principal cities throughout the world

CLARK®

Balanced
Opposed
Compressors

"Most Efficient Yard Crane We've Used"

Says

Henry J. Hettinger

Asst. Supt. in Charge of Maintenance
Greenpoint Works
Brooklyn Union Gas Co.

KARRI-GO

FRONT-BOOM MOBILE CRANE

5 and 7½ Ton Cap.

FEATURE: *"Live Boom" with Hydraulic Power Topping*

"Our **KARRI-GO** saves us time and money," says Mr. Hettinger. "The short turning radius makes it very flexible. It does many jobs faster, more economically than our three big cranes. We use it indoors and outdoors . . . for removing and installing underground cable, 12" pipe, valves, large valve bonnets and gates. On repairs, the **KARRI-GO** carries motors, speed-reducers, compressors, pumps, and other machinery to and from the machine shop. Handles reels, 55-gal. drums, steel beams and forms; it loads and unloads trucks; stacks materials for storage. This **KARRI-GO** has to cover a lot of ground . . . the area of our yard is over 115 acres. To carry bigger loads and cut down travel trips, we often attach a trailer to the pintle hook. Doing a fine job here."

Send for Bulletin #73C

Mfrs. of KRANE KAR Swing-Boom Mobile Crane

SILENT HOIST & CRANE CO. 851 63rd ST., BROOKLYN 20, N.Y.

Short Cut for Executives Considering

NEW PLANT SITES

This 28-page booklet outlines, without exaggeration, the principal advantages of a state which has been designated by industrialists already located in Tennessee as "America's No. 1 Industrial Opportunity."

From the booklet you can get a clear picture of Tennessee towns and cities, markets, labor, raw materials, fuels and power, transportation, industrial capacity and diversification, living conditions, industrial tradition, recreational facilities, and the close cooperation you will obtain from Tennessee officials in choosing the exact location you need.

Don't make any decision about a new plant site until you investigate Tennessee thoroughly. As an invaluable short-cut to this investigation, fill out the coupon below.

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Industrial & Agricultural Development Commission
1-1 Cordell Hull Building
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Please send "Basic Data" booklet

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FIRM_____

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Abrasive cleaning tool

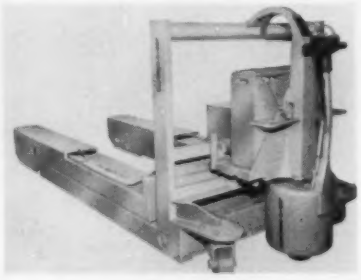
An abrasive cleaning tool is lightweight (11 lb including abrasive), allowing operation inside tanks, on ceilings, floors, accomplishing cleaning before and after weld and on other maintenance problems. Its features provide complete recovery

of the abrasive and dust, with a cyclone removing the dust into the attached bag and allowing the abrasive to re-enter the hopper for reuse. A single ½ in. air line is the only connection required. The unit, operates on 33 to 60 cfm air supply. *Clementina Ltd.*

For more data circle No. 45 on postcard, p. 81

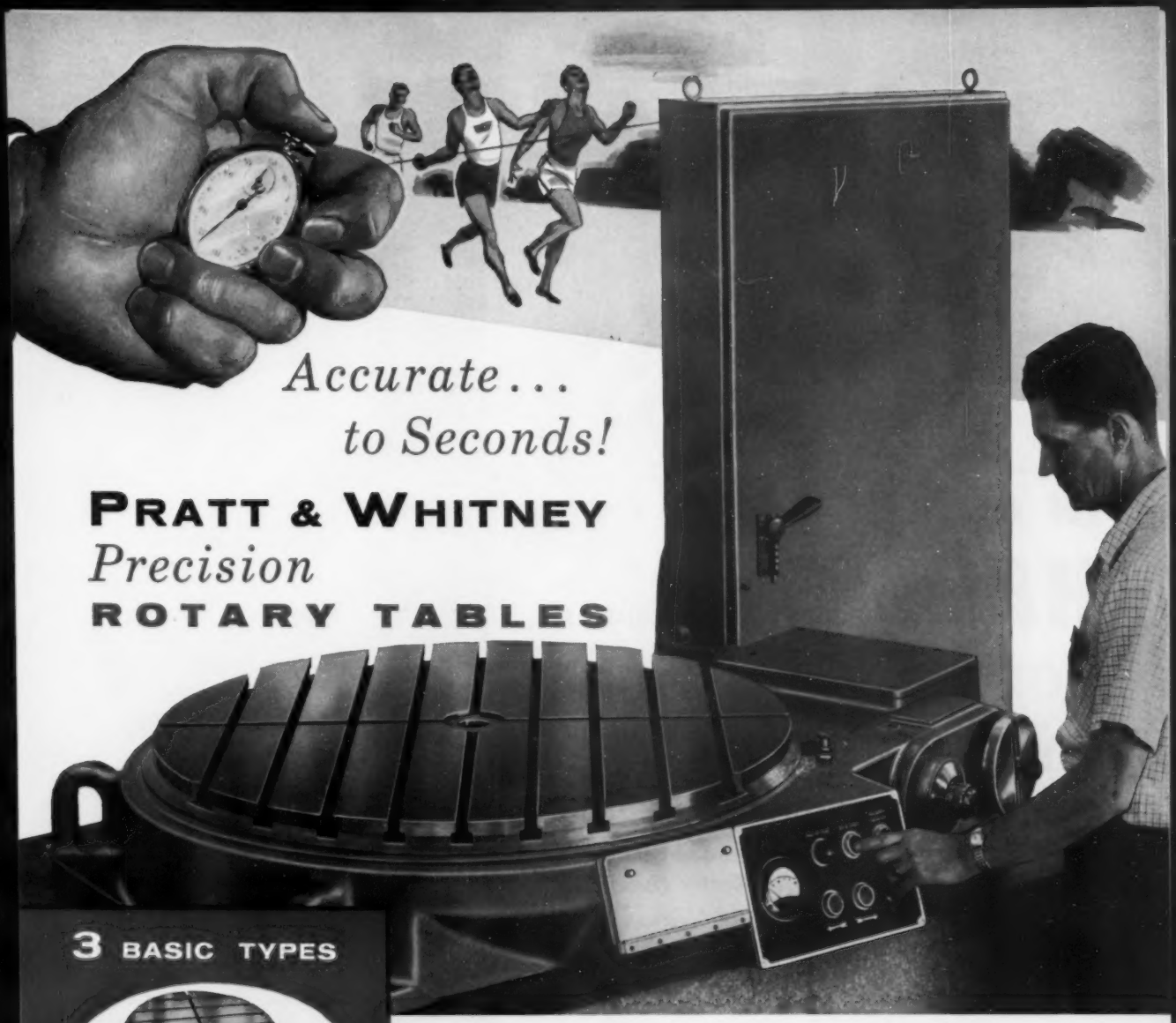
Lift truck

This special 16,000 lb capacity electric truck was built to transport large bulky loads which rest directly on the floor without pallets or dunnage. Lifting arms straddle the loads to be picked up, while retractable fingers in the arms of the



truck are extended into slots in the load. When these are engaged, the load is lifted for transporting. *Lewis-Shepard Products, Inc.*

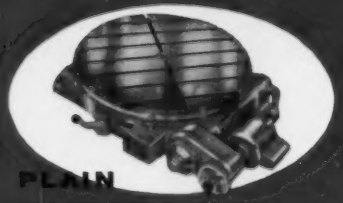
For more data circle No. 46 on postcard, p. 81



Accurate . . .
to Seconds!

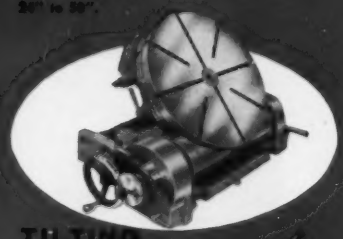
PRATT & WHITNEY
Precision
ROTARY TABLES

3 BASIC TYPES



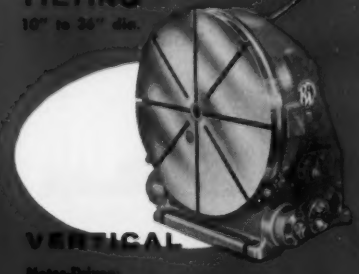
PLAIN

Hand; 12" and 36" dia. Motor-Driven; 24" to 50".



TILTING

10" to 36" dia.



VERTICAL

Motor-Driven; 30" and 48" dia.

Like the timer's stop watch, Pratt & Whitney Rotary Tables are *accurate to seconds* . . . seconds of arc, that is! And they're built for ruggedness and stamina too. They'll help you eliminate expensive jigs and set-up changes on difficult, precise machining jobs year after year. Ideal, too, for reliable inspection and circular indexing.

Featured here is the latest in this advanced line . . . the new 42" Plain Rotary Tables WITH AUTOMATIC INDEXING. Work is automatically positioned to any desired angle by means of easily set dogs. Initial *and* repeat settings are made with the same dependably high accuracy.

Now . . . Pratt & Whitney Rotary Tables can also be furnished with indexing control by **numerical data.**

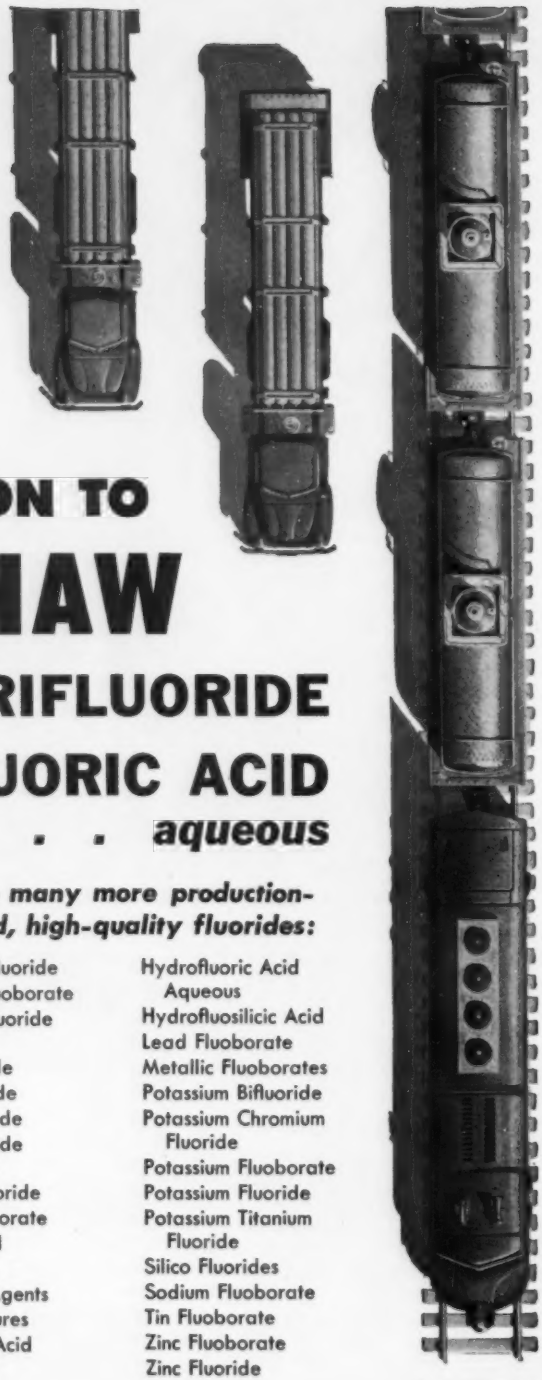
WRITE FOR COMPLETE INFORMATION . . . ask for illustrated circulars fully describing P&W Precision Rotary Tables.

PRATT & WHITNEY COMPANY
INCORPORATED

10 Charter Oak Boulevard, West Hartford, Connecticut

Direct Factory Representatives in Principal Cities

MACHINE TOOLS • GAGES • CUTTING TOOLS



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BORON TRIFLUORIDE
HYDROFLUORIC ACID

anhydrous . . . aqueous

Here are many more production-controlled, high-quality fluorides:

Ammonium Bifluoride
Ammonium Fluoborate
Antimony Trifluoride Sublimed
Barium Fluoride
Bismuth Fluoride
Boron Trifluoride
Boron Trifluoride Complexes
Chromium Fluoride
Copper Fluoborate
Fluoboric Acid
Fluorine Cells
Fluorinating Agents
Frosting Mixtures
Hydrofluoric Acid Anhydrous
Hydrofluoric Acid Aqueous
Hydrofluosilicic Acid
Lead Fluoborate
Metallic Fluoborates
Potassium Bifluoride
Potassium Chromium Fluoride
Potassium Fluoborate
Potassium Fluoride
Potassium Titanium Fluoride
Silico Fluorides
Sodium Fluoborate
Tin Fluoborate
Zinc Fluoborate
Zinc Fluoride

THE HARSHAW CHEMICAL CO.
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WRITE FOR
Harshaw's 40-page Book on Hydrofluoric Acid Anhydrous. It provides helpful data.

JUST TRY IT!

..ask for a sample bar of LaSalle's revolutionary

NEW fatigue-proof STEEL BAR

..the bar that has HIGH STRENGTH without heat treating

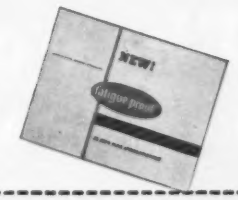
Yes, La Salle invites you to test a sample bar of the remarkable new FATIGUE-PROOF. This amazing new material is its own best recommendation . . . as proven by the many original equipment manufacturers who have already tested (and are using) FATIGUE-PROOF.

If you are making parts requiring strengths in the tensile range of 140,000 to 150,000 psi, and want to eliminate the expense or problems of heat treating . . . if you want to save production costs with a bar that machines faster (25% faster than annealed alloys—50% to 100% faster than heat treated alloys) and gives you a beautiful finish, too . . . if you want to improve the quality of your product while saving money, send us a blueprint, drop us a note giving application details, or better yet . . . pick up your telephone and call a La Salle sales engineer (REgent 4-7800, Chicago, Illinois).

If it appears that FATIGUE-PROOF can help you improve your product and cut your cost, he will arrange to provide the necessary test sample at no expense to you.

NEWLY PUBLISHED!

Get your copy of this 20-page booklet which gives detailed information on the remarkable new "FATIGUE-PROOF."



La Salle STEEL CO.

1436 150th STREET • HAMMOND, INDIANA

Manufacturers of America's Most Complete Line of Quality Cold-Finished Steel Bars

Please send me your "FATIGUE-PROOF" Bulletin.

Name_____

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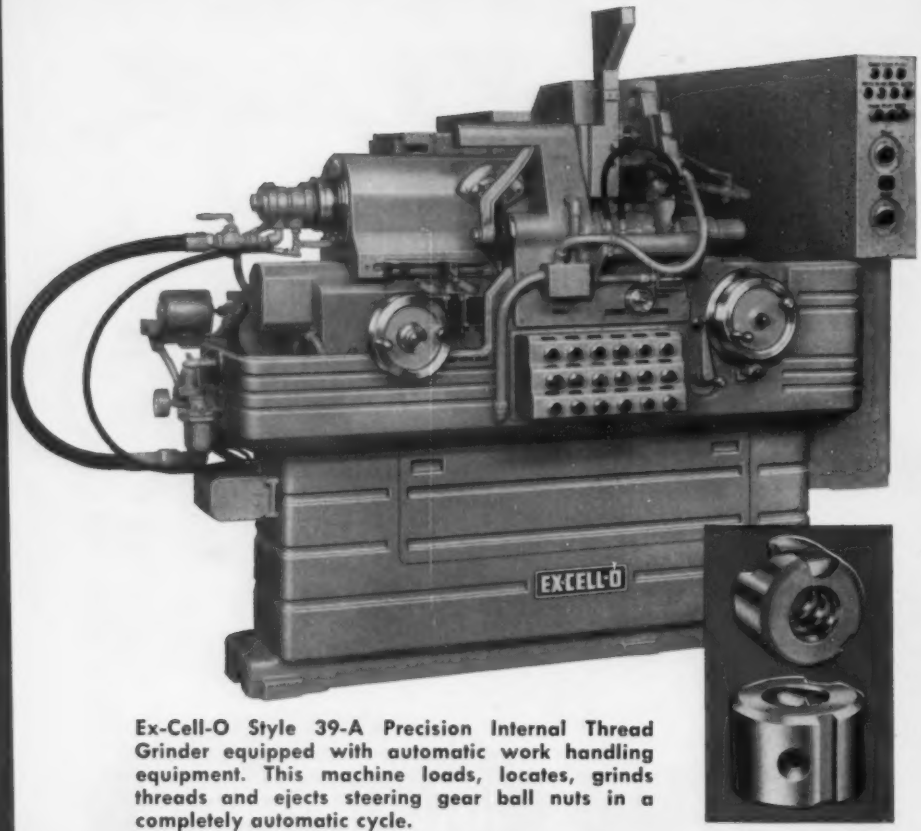

Ex-Cell-O Style 39-A Precision Internal Thread Grinder equipped with automatic work handling equipment. This machine loads, locates, grinds threads and ejects steering gear ball nuts in a completely automatic cycle.

EX-CELL-O
Thread Grinders
Manual – Automatic – Automated

EX-CELL-O STYLE 33 FOR EXTERNAL THREADS: An accurate production machine, automatic except for loading, unloading, and moving the cycle lever. Can be arranged for tapered grinding and for eccentric relief grinding.

EX-CELL-O STYLE 36 FOR LONG EXTERNAL THREADS, also available with internal attachment. A high production machine with easily adjusted work cycles.

EX-CELL-O STYLE 50: A versatile machine for external work . . . also available with internal attachment.

EX-CELL-O STYLE 120: Our largest Thread Grinder. Grinds 10 feet of thread in one setting. Accommodates 12 feet of stock between centers.

These standard machines are grinding thread gages, machine tool lead screws, innumerable aircraft parts, automotive steering mechanisms and pinions, worms, taps, and many similar workpieces.

Precision thread grinders in this Ex-Cell-O line range from manually-operated models, for toolroom and for short runs, to high production automatics, to styles equipped with automatic work handling equipment. There are five models designed to meet your every requirement.

For specific information on thread grinder operations or a quotation on a machine for your requirements, call your local Ex-Cell-O representative or write Ex-Cell-O in Detroit.

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

56-5

XLO

STEEL OUTLOOK | Markets and Prices

The Iron Age SUMMARY . . .

Steel prices and labor take the spotlight . . . Hassle over prices indicates undercurrent favoring higher prices immediately . . . Speculation renewed over labor.

A Witch's Brew . . . A double-barreled hassle centering around prices and labor was stirring up a witch's brew in steel this week. (See p. 24.) The two-way rhubarb put the finger on the most sensitive spots in the steel market picture.

It's evident that some producers are chafing at the bit to push steel prices higher—now. Their argument is that more income from sales is needed to help finance an urgently-needed expansion program.

An exchange between one steel producer and the president of the steelworkers' union over the inflationary effects of union gains has touched off renewed speculation over outcome of steel labor negotiations this spring.

Meanwhile, the steel market gives no sign of faltering despite spot weaknesses in some products and some consuming areas. And the flurry over prices and labor is likely to prompt consumers to step up their buying in the hope of building inventory as a hedge.

Orders Up . . . While Detroit is blowing hot and cold, depending on the product involved, the overall trend in steel demand is up. During the last 10 days, steel order volume has been running 15 to 30 pct ahead of shipments. Steel output this month will approach the 11-million-ton mark, something that would have been considered fantastic several years ago.

Despite this all-out production, the mills have made little or no headway against heavy backlogs. Some took the auto cutbacks too literally and find themselves oversold for second quarter. One mill is at least 60 days behind on delivery promises and sees little hope of improving this situation in the near future.

The scramble for a favored position on mills order books involves industry generally. But it's most apparent in the case of freight car builders and the can makers.

Construction Delays . . . Seasonal influences are increasing the pressure on plates and structurals. Contractors and steel fabricators are getting jittery over the prospects for future steel availability. Desperate consumers are paying premiums for plates in some areas. Due largely to the situation in structurals, schools, churches, and public buildings have been shoved back on erection schedules.

The trend in scrap prices continues upward as inclement weather and strong demand force mills to bid higher for the available supply.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,425	2,449	2,437	2,280
Ingot Index				
(1947-1949=100)	151.0	152.5	152.4	141.7
Operating Rates				
Chicago	93.5	99.5	98.5	97.0
Pittsburgh	102.0	102.0*	103.0	97.0
Philadelphia	100.0	105.0*	103.0	94.5
Valley	97.0	91.0*	97.0	95.0
West	102.0	101.0	98.0	98.0
Detroit	103.0	103.0	93.0	91.0
Buffalo	105.0	105.0	105.0	100.0
Cleveland	105.0	105.0*	105.5	102.0
Birmingham	93.0	86.0	95.0	87.5
S. Ohio River	90.0	88.0*	96.5	91.0
Wheeling	101.0	102.0*	100.5	90.0
St. Louis	97.0	100.0	106.0	95.0
Northeast	90.0	90.0	85.0	82.0
Aggregate	98.5	99.5	99.0	94.5

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.797
Pig Iron (Gross Ton)	$59.09	$59.09	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$52.50	$50.17	$47.83	$37.00
Nonferrous				
Aluminum ingot	25.90	24.40	24.40	23.20
Copper, electrolytic	46.00	46.00	46.00	36.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Magnesium	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	99.00	100.25	104.75	91.25
Zinc, E. St. Louis	13.50	13.50	13.50	11.50

Warehouses Feel Pressure

Many users are trying to avoid warehouse buying . . . But few are able to back away entirely . . . Resurging demand from Detroit lifts market . . . Strike-price buying possible.

◆ A LARGE NUMBER of large steel buyers are trying to back away from warehouse steel to return to 100 pct mill schedule purchasing. But they aren't having much luck although there has been a reduction in advance ordering at the warehouse level.

What it amounts to is that major purchasers aren't placing warehouse orders too far ahead. They have hope that in the next 60 days steel will ease to the extent that higher priced warehouse steel won't be necessary. In most cases, that is wishful thinking. Steel users will have to resort to warehouse purchases to almost the same extent in the next few months as in the past year.

You will hear some stories about declines in warehouse buying. In the majority of cases, they can be discounted. Against some declines in advance orders, consider these facts:

A major appliance maker is trying to line up a large tonnage of warehouse steel in Detroit.

Small warehouses in Chicago have been getting as much as 50 pct more business from stampers who would normally get all or almost all of their requirements via the mill schedule.

There are a few cases of diminished warehouse buying, but most are in anticipation of diminished automotive business (which has not materialized to the extent that was feared). These same customers are still laying in all the mill steel they can get, even to the extent of a strike-bound farm equipment manufacturer who is putting all possible steel in storage and not reducing his mill buying.

In most market areas, however, warehouses are picking up a little inventory. Some could even use a little more flat-rolled business to take up some of the automotive decline. But in general, warehouse steel is still a factor in filling the steel demands of many large consumers.

SHEETS AND STRIP . . . Although the automotive market was a question mark, new demands for May and June have tightened up the market with a snap. Overall demand is universally strong. **Pittsburgh** demand for flat-rolled continues tight, with cold-rolled products a trifle easier than hot-rolled. Hot-rolled demand in **Detroit** is especially strong, with most mills sold out through second quarter. **Chicago** reports, after fluctuating from hot to cold for about three weeks, have settled down to a routine line that business is strong, no cancellations locally, with customers slightly less frantic. Most cold-rolled sheet turned down by automakers earlier this year has been snapped up. Now tonnage is strictly limited and in some cases automakers will get much less than they want in the next few months. There may be some strike-price hedging involved here.

BARS . . . There is more complaint than actual loss of business. Bars are also universally tight, with apprehension about automotive demand causing some alarm. This has been largely needless to date. In **Pittsburgh**, for example, alloy bar producers are counting car sales daily. Reductions in March bookings of alloy has been noted, but producers are not sure whether the dip reflects changed inventory policies or reduced needs. If it is a reduction in lead time, orders should bounce back next month. **Pittsburgh** bookings on cold-finished bars are solid through the second quarter. Alloy bars are easing slightly in **Detroit**. Carbon bars are in good supply, but hot top bars are still scarce. **Cleveland** mills are booked solid through the first half on carbon bars and some larger sizes are still being produced on alloy bar facilities because nickel tightness does not permit full production of alloys.

STRUCTURALS . . . No letup in a demand that makes this market as tight as any. Lack of availability of light structurals (and plate) has forced rail car makers to cut back production to the point where it has interfered with orders of components. This has been reflected in **Chicago** while one **Detroit** source believes that entire year could be sold out if orders could be taken. **West Coast** demand for structurals is strengthening with new highway programs.

PLATE . . . Situation here parallels that in structurals. **Cleveland** fabricators have gone as far as **Philadelphia** for plate and structurals.

STAINLESS . . . Only official indication of business beyond June is in stainless where one **Pittsburgh** source reports July incoming orders are coming in at a good rate already. Current pace is affording little chance to build up semi-finished stocks. In addition to the commercial picture, stainless is involved in missile and aircraft picture. Producers feel that a significant defense market is opening up, have stepped up research.

WIRE . . . Manufacturers wire is still strong. Production is at capacity for most producers and books are full as far ahead as orders have been taken. Some competition is being felt along South Atlantic and Gulf coasts where barbed wire is coming in from foreign producers. Low price permits it to move relatively far inland.

GALVANIZED . . . No letup and some indication that carryover situation is getting worse rather than better. Greater output from sheet lines in the **Chicago** area, for example, hasn't helped.

Purchasing Agent's Checklist

STEEL WAREHOUSES: Buying from warehousing in combination with mill schedules can save money ..... p. 19

CASTINGS: Demand high, prices may go up ..... p. 22

INDUSTRIAL DIAMONDS: New tooling applications ..... p. 23

OIL: Middle East trouble spells danger here ..... p. 26

Comparison of Prices

(Effective March 27, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Mar. 27 1956	Mar. 26 1956	Mar. 1 1956	Mar. 29 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	*6.28*	6.29	6.29	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl'a C-R strip (No. 302)	44.50	44.50	44.50	42.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	6.60¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.179¢	5.179¢	5.179¢	4.797¢

	Mar. 27 1956	Mar. 20 1956	Mar. 28 1956	Mar. 29 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$64.26	$63.69	$63.69	$61.19
Foundry, Valley	60.50	59.00	59.00	56.50
Foundry, Southern Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia	63.73	62.77	62.77	60.27
Basic, Valley furnace	56.00	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	60.50	59.00	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
‡ 74.76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$59.71	$59.09	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$53.50	$51.50	$47.50	$38.50
No. 1 steel, Phila. area	53.00	50.50	49.50	37.00
No. 1 steel, Chicago	51.00	48.50	46.50	35.50
No. 1 bundles, Detroit	46.50	44.50	44.50	29.50
Low phos., Youngstown	59.50	57.50	53.50	37.50
No. 1 mach'y cast, Pittsburgh	57.50	57.50	55.50	43.50
No. 1 mach'y cast, Philadel'a	55.50	55.50	54.50	44.50
No. 1 mach'y cast, Chicago	55.50	53.50	50.50	46.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$52.50	$50.17	$47.83	$37.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$46.00	$46.00	$46.00	$36.00
Copper, Lake, Conn.	46.00	46.00	43.00	33.00
Tin, Straits, New York	99.00†	100.25	104.75	91.25
Zinc, East St. Louis	13.50	13.50	13.50	11.50
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	25.90	24.40	24.40	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	33.25	33.25	33.25	27.75
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50
† Tentative. ‡ Average. * Revised.				

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphie, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To Identify producers, see Key on P. 120→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B1*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	62.00	62.50	63.00	63.50	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	60.00	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	60.00	60.50	61.00	61.50	.....
Chester *C17*	62.00	62.50	63.00	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50†
Cleveland *R3*	58.50	59.00	59.00	59.50	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	62.50	63.00	.....	.....
Fontana *K1*	66.00	66.50	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Midland *C11*	58.50	.....	.....	.....	.....
Minnequa *C6*	62.00	62.50	63.00	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	60.00	60.50	60.50	61.00	65.00†
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	60.00	60.50	60.50	61.00	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	62.00	62.50	63.00	63.50	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. * Add $1.00 for 0.31-0.60 pct phos. † Intermediate low phos.

Silvery Iron Buffalo, *H1*, $68.75; Jackson, *J1*, *G1*, $67.50. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct managanese over 1.0 pct. Bessomer ferrocilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	301	302	303	304	316	321	348	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	32.25	32.25
Sheets	44.25	44.50	52.25	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	50.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, (2.25¢ lower on Type 430) *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*.

Scrap Market Gets Hotter

Prices leap in most consuming areas . . . Big strength comes from Cleveland and Valley . . . Chicago market feels its oats in another major surge . . . Composite up $2.66.

◆ REFLECTING continued strong steel demand and vagaries of early-spring weather, prices in most consuming areas reacted sharply upward this week as consumers bid high for available tonnages. Some mills went far afield in their efforts to assure enough scrap to maintain production.

In the Boston area, prices moved up in self-defense against raids from other areas, particularly Cleveland, and a succession of blizzards that tied the district in knots and slowed movement of scrap. Cleveland price advanced $4.50 on the basis of new buys, and the Valley moved up $3 per ton for the same reason.

Pittsburgh market advanced $2 per ton on the basis of a purchase by a leading consumer. Philadelphia price moved up $2.50 per ton as a mill moved into the market for a new tonnage. New York price also advanced in line with what seemed to be a national trend.

Some consumers were willing to pay heavy freight charges to bring scrap into the mills. Buffalo, which moved up $5 per ton, indicated that the price increase was due to the siphoning off of material by consumers in other areas.

THE IRON AGE Scrap Composite advanced $2.66 per ton to $52.83 per ton, 84¢ per ton below the all-time high established early last January.

Pittsburgh . . . Steelmaking grades advanced $2 per ton this week on the basis of a purchase by a leading district consumer. The purchase for a representative tonnage was in line with an upward trend in adjoining areas. Higher prices elsewhere were threatening to siphon off tonnages from this district at a time when inventory in dealers' yards was at low ebb. Earlier, brokers were having difficulty filling lower-priced orders.

Chicago . . . In the year's hottest local market thus far, broker buying prices continued to advance past consumer delivered prices as consumer prices snapped up another $2 across the list. As St. Louis prices advanced in an effort to hold scrap in the area, Chicago brokers continued to get offers from far afield for nearly all grades. Even cast was skyrocketing with foundries booking strong tonnages and giving as much as 60 days' delivery time. No. 2 heavy melting scored a major advance of $4, and at press time prices of $45 at the broker level were already being reported. New electric furnace grades continue to spread far beyond the usual price ranges.

Philadelphia . . . A market pinned down last week by an unseasonal blizzard came to life this week and exhibited good strength especially in the openhearth grades. On the basis of a representative sale, the price of No. 1 heavy melting and No. 1 bundles moved up $2.50. No. 2 heavy melting was up $1. Blast furnace grades also advanced about $1 to $1.50. Premium and railroad grades followed the stronger market trend, up about $1.00.

New York . . . Steelmaking grades advanced $1 to a top of $46 for No. 1 heavy melting on the basis of further business in an adjacent area.

Detroit . . . Openhearth grades moved upward on general market strength and increases in adjacent market areas. Predictions are that prices will go even higher at the closing of automotive lists. With water-shipping season about to start, demand from other areas for choice automotive scrap should pull higher prices.

Cleveland . . . Local price shot up to $58 for top grades from specified yards as a local mill came into the market and had to up price for distant scrap against the Valley. Youngstown price also rose $3 to $59 for No. 1 heavy melting or $1 over Cleveland, reflecting approximate freight difference to two points from western Ohio. Cleveland brokers are reaching beyond state borders to cover their orders at up to $10 freight bills since local yards all but cleaned out on primary grades. One lot of 1000 tons of automotive bundles from Indianapolis was sold in Valley for over $59 delivered. Bidding for local automotive lists is expected to be high since strong Detroit market will keep most lists there at home.

Birmingham . . . The domestic scrap market in this district continues weak, with two steel mills holding up shipments again. The export market has shown a little additional strength but prices continue steady. Considerable scrap continues to move north out of the southern area because of higher prices offered.

St. Louis . . . Pressure of competition from Chicago and other markets upon sources of scrap iron in this area caused the St. Louis market to advance its prices for Nos. 1 and 2 heavy melting and No. 2 bundles $2 a ton, and No. 1 bundles $3.50 a ton. Prices for the heavy melting grades had remained stationary for the last six weeks. Cupola cast and cast iron brake shoes also are up $1.

Cincinnati . . . Local market went up $2 last week on small buy of secondary material by local mill and increased broker buying prices for anticipated heavy tonnages in April. Additional increase expected in primary grades next week with announcement of area buying program by local consumer against anticipated heavy out-of-area bids.

Buffalo . . . Despite absence of local buying, prices of primary steelmaking grades jumped $5 on the basis of purchases from Cleveland and the Valley.

Boston . . . No. 1 heavy melting moved up $3 per ton this week as consumers bid up the price against competition from other areas and slow movement of material due to a succession of blizzards. The Boston area has been hit by three big snow storms in a period of eight days.

West Coast . . . Mills have plenty of scrap. At one mill inventories are so good the firm simply isn't buying.

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING

Robert F. Mushet

Mushet conducting an early experiment with spiegeleisen. *. . . This is the thirteenth in a series of outstanding developments that have contributed to the progress of the iron and steel industry.*

1856
Spiegeleisen
"Looking-glass Iron"

Because Robert Mushet was quick to recognize the properties of Spiegeleisen in 1848 – then known as "looking glass iron" because of its brightness – he was able not only to raise the production of iron and steel but improve the quality as well. His early experiments are credited with helping both the Bessemer and Kelly processes in the making of steel. He did it by adding Spiegeleisen, a compound of iron, carbon and manganese to the metal after it had been subjected to an air blast. The Spiegeleisen deoxidized the metal and restored the small amount of carbon and manganese necessary to give steel the chemical composition desired.

Chemical composition plays a vital role in the field of scrap, too. Today, the finest grades of pig iron and the most selective grades of scrap produce America's finest grades of steel. These special steels require scrap of known analysis – a problem we are more than qualified to solve because of our experience, personnel, equipment and the strategic location of our offices. We would like to put our facilities to work for you.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

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EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Scrap Prices *(Effective March 27, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	53.00 to 54.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	34.00 to 35.00
Mixed bor. and ms. turn.	34.00 to 35.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Low phos. punch'gs plate	61.00 to 62.00
Heavy turnings	47.00 to 48.00
No. 1 RR hvy. melting	59.50 to 60.50
Scrap rails, random lgth.	66.00 to 67.00
Rails 2 ft and under	71.00 to 72.00
RR. steel wheels	61.00 to 62.00
RR. spring steel	61.00 to 62.00
RR. couplers and knuckles	61.00 to 62.00
No. 1 machinery cast	57.00 to 58.00
Cupola cast	51.00 to 52.00
Heavy breakable cast	47.00 to 48.00

Chicago

No. 1 hvy. melting	$50.00 to $52.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 factory bundles	54.00 to 55.00
No. 1 dealers' bundles	50.00 to 51.00
No. 2 dealers' bundles	39.00 to 40.00
Machine shop turn	30.00 to 31.00
Mixed bor. and turn	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. forge crops	59.00 to 60.00
Low phos. punch'gs plate	55.00 to 56.00
Low phos. 3 ft and under	54.00 to 55.00
No. 1 RR. hvy. melting	54.00 to 56.00
Scrap rails, random lgth	63.00 to 64.00
Rerolling rails	69.00 to 70.00
Rails 2 ft and under	68.00 to 69.00
Locomotive tires, cut	59.00 to 60.00
Cut bolsters & side frames	59.00 to 60.00
Angles and splice bars	66.00 to 67.00
RR. steel car axles	65.00 to 66.00
RR. couplers and knuckles	59.00 to 60.00
No. 1 machinery cast	55.00 to 56.00
Cupola cast	51.00 to 52.00
Heavy breakable cast	43.00 to 44.00
Cast iron brake shoes	42.00 to 43.00
Cast iron car wheels	49.00 to 50.00
Malleable	62.00 to 63.00
Stove plate	43.00 to 44.00
Steel car wheels	61.00 to 62.00

Philadelphia Area

No. 1 hvy. melting	$52.50 to $53.50
No. 2 hvy. melting	42.00 to 44.00
No. 1 bundles	52.50 to 53.50
No. 2 bundles	41.00 to 43.00
Machine shop turn	35.50 to 37.00
Mixed bor. short turn	36.00 to 37.00
Cast iron borings	37.00 to 38.00
Shoveling turnings	39.00 to 40.00
Clean cast chem. borings	41.00 to 42.00
Low phos. 5 ft and under	54.00 to 55.00
Low phos. 2 ft and under	56.00 to 57.50
Low phos. punch'gs	56.00 to 57.50
Elec. furnace bundles	53.00 to 54.00
Heavy turnings	48.50 to 49.50
RR. steel wheels	59.00 to 60.00
RR. spring steel	59.00 to 60.00
Rails 18 in. and under	66.00 to 67.00
Cupola cast	50.00 to 51.00
Heavy breakable cast	53.00 to 54.00
Cast iron car wheels	55.00 to 56.00
Malleable	67.50 to 68.50
Unstripped motor blocks	38.00 to 39.00
No. 1 machinery cast	55.00 to 56.00

Cleveland

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 bundles	57.00 to 58.00
No. 2 bundles	44.00 to 45.00
No. 1 busheling	57.00 to 58.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	33.00 to 34.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Cut struct'r'l & plates, 2 ft & under	58.00 to 59.00
Drop forge flashings	57.00 to 58.00
Low phos. punch'gs, plate	57.00 to 58.00
Foundry steel, 2 ft & under	56.00 to 57.00
No. 1 RR. heavy melting	57.00 to 58.00
Rails 2 ft and under	69.00 to 70.00
Rails 18 in. and under	70.00 to 71.00
Railroad grate bars	40.00 to 41.00
Steel axle turnings	34.00 to 35.00
Railroad cast	56.00 to 57.00
No. 1 machinery cast	55.00 to 56.00
Stove plate	51.00 to 52.00
Malleable	58.00 to 59.00

Youngstown

No. 1 hvy. melting	$58.00 to $59.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 bundles	58.00 to 59.00
No. 2 bundles	43.00 to 44.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	34.00 to 35.00
Low phos. plate	59.00 to 60.00

Buffalo

No. 1 hvy. melting	$50.00 to $51.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 busheling	50.00 to 51.00
No. 1 bundles	50.00 to 51.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	59.00 to 60.00
Scrap rails, random lgth.	55.00 to 56.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	55.00 to 56.00
RR. spring steel	55.00 to 56.00
RR. couplers and knuckles	55.00 to 56.00
No. 1 machinery cast	52.00 to 53.00
No. 1 cupola cast	49.00 to 50.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles, openhearth	47.00 to 48.00
No. 2 bundles	35.00 to 36.00
New busheling	47.00 to 48.00
Drop forge flashings	46.00 to 47.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs, plate	48.00 to 49.00
No. 1 cupola cast	44.00 to 45.00
Heavy breakable cast	37.00 to 38.00
Stove plate	38.00 to 39.00
Automotive cast	48.00 to 49.00

St. Louis

No. 1 hvy. melting	$42.50 to $43.50
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	26.00 to 27.00
Cast iron borings	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
No. 1 RR. hvy. melting	52.00 to 53.00
Rails, random lengths	58.50 to 59.50
Rails 18 in. and under	65.00 to 66.00
Locomotive tires uncut	53.00 to 54.00
Angles and splice bars	56.00 to 57.00
Std. steel car axles	59.00 to 60.00
RR. specialties	55.00 to 56.00
Cupola cast	48.00 to 49.00
Heavy breakable cast	38.50 to 39.50
Cast iron brake shoes	39.50 to 40.50
Stove plate	39.50 to 40.50
Cast iron car wheels	50.00 to 51.00
Rerolling rails	65.00 to 66.00
Malleable	50.00 to 51.00
Unstripped motor blocks	38.00 to 39.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	32.00 to 32.50
No. 1 busheling	44.00 to 45.00
Elec. furnace, 3 ft & under	45.50 to 46.50
Machine shop turn.	26.00 to 26.50
Mixed bor. and short turn.	27.00 to 28.00
Shoveling turnings	29.00 to 30.00
Clean cast chem. borings	31.00 to 31.50
No. 1 machinery cast	44.50 to 45.50
Mixed cupola cast	40.00 to 41.00
Heavy breakable cast	42.50 to 43.00
Stove plate	38.00 to 39.00
Unstripped motor blocks	26.00 to 26.50

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	40.00 to 41.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	26.00 to 27.00
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast	47.00 to 48.00
Mixed yard cast	44.00 to 45.00
Charging box cast	44.00 to 45.00
Heavy breakable cast	44.00 to 45.00
Unstripped motor blocks	29.00 to 30.00

Birmingham

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	36.00 to 37.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	26.00 to 27.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	21.00 to 22.00
Electric furnace bundles	42.00 to 43.00
Structural and plate, 2 ft	49.00 to 50.00
Structural and plate, 2 ft	50.00 to 51.00
No. 1 RR. hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	57.00 to 58.00
Rails, 18 in. and under	60.00 to 61.00
Angles & splice bars	57.00 to 58.00
Rerolling rails	61.00 to 62.00
No. 1 cupola cast	47.50 to 48.50
Stove plate	46.00 to 47.00
Charging box cast	32.00 to 33.00
Cast iron car wheels	37.00 to 38.00
Unstripped motor blocks	37.00 to 38.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$50.00 to $51.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 bundles	50.00 to 51.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	32.00 to 33.00
Low phos. 18 in. & under	56.00 to 57.00
Rails, random lengths	60.00 to 61.00
Rails, 18 in. and under	66.00 to 67.00
No. 1 cupola cast	46.00 to 47.00
Hvy. breakable cast	44.00 to 45.00
Drop broken cast	56.00 to 57.00

San Francisco

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	30.00
No. 1 bundles	35.00
No. 2 bundles	26.00
No. 3 bundles	20.00
Machine shop turn.	18.00
Cast iron borings	20.00
No. 1 RR. hvy. melting	45.00
No. 1 cupola cast	45.00

Los Angeles

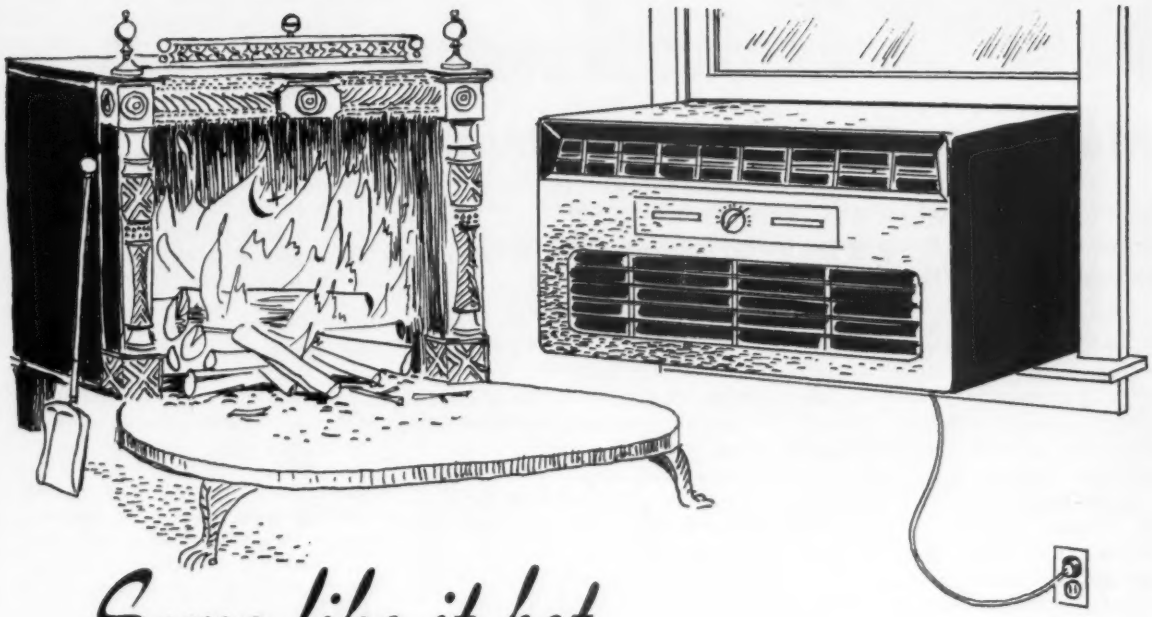
No. 1 hvy. melting	$38.00
No. 2 hvy. melting	32.00
No. 1 bundles	37.00
No. 2 bundles	28.00
No. 3 bundles	22.00
Machine shop turn.	18.00
Shoveling turnings	21.00
Cast iron borings	18.00
Elec. furn. 1 ft and under	38.00
No. 1 RR. hvy. melting	38.00
No. 1 cupola cast	44.00

Seattle

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	35.00
No. 2 bundles	26.00
No. 3 bundles	20.00
No. 1 cupola cast	45.00
Mixed yard cast	45.00

Hamilton, Ont.

No. 1 hvy. melting	$48.50
No. 2 hvy. melting	44.50
No. 1 bundles	48.50
No. 2 bundles	41.00
Mixed steel scrap	42.50
Bushelings	38.50
Bush., new fact., prep'd	46.50
Bush., new fact., unprep'd	42.50
Machine shop turn.	18.00
Short steel turn.	27.50
Mixed bor. and turn.	$16.00 to 19.00
Rails, rerolling	53.50
Cast scrap	42.00 to 45.00



Some like it hot...

Some like it cold...

For the purchase

or sale of

iron or steel scrap

. . . phone or write

"Your Chicago Broker"

Early man discovered fire would warm his cave; Roman emperors sought hot weather relief by bringing snow from the mountains; Leonardo Da Vinci designed an air conditioning unit for the boudoir of his patron's wife; in 1742, Benjamin Franklin invented the open front house heating stove. But not until the present century did man learn how to create and control atmospheric conditions for specific requirements.

Today, heating, cooling, or humidity control relies heavily upon the production of steel for parts and assemblies. And air conditioning is just one of thousands such demands—for commercial, industrial, military and civilian uses.

To meet all requirements, an adequate supply of scrap must be made available continuously.

M. S. KAPLAN COMPANY

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Aluminum Up In Surprise Move

Kaiser makes the first move . . . Reynolds follows suit within 24 hours . . . Alcoa makes it unanimous . . . Claim need for expansion capital as big reason.

◆ KAISER ALUMINUM & Chemical Co., nation's third largest primary aluminum producer, announced a price increase of 1½¢ per lb for all grades of aluminum effective Monday of this week.

Late Monday Reynolds Metals Co. backed up the Kaiser move by boosting its prices by the same amount, effective Tuesday.

Alcoa made it unanimous. Effective March 29, all its products will be pegged at the new price. Company spokesman indicated the increase has been under considerateation for some time.

Reynolds said the increase was necessary to finance needed additional expansion. According to Reynolds, capital requirements for new aluminum facilities are unusually large. From ore to pig stage costs about $1500 per ton of capacity, Reynolds insists. At present all of the company's plants are operating at capacity.

Also, higher freight rates cost Reynolds an additional $1.2 million in 1955.

In comparing the increase in price over the years, Reynolds claims that since 1939 the cost for new aluminum production has risen 400 pct, labor costs up 200 pct, cost of materials doubled while this latest price increase makes 1956 aluminum higher than 1939 by only 20 pct.

This increase has not basically affected aluminum's weapon aimed at securing part of many markets heretofore dominated by copper, namely price stability. Copper is fluctuating more than ever in an effort to settle down on a world price. Despite the fact that the price hike came as a bit of a surprise, aluminum still holds an edge in this market aspect.

COPPER . . . Thus far there has been no clarification from Anaconda on its new policy of pricing copper from its Chilean subsidiaries on the basis of London Metals Exchange quotations. Nor is there likely to be.

An Anaconda spokesman indicated early this week that the company felt it had revealed as much as was possible considering the fact the price will vary with situations.

Currently all that is known is (1) the first or official session of the London exchange will be used, (2) in the case where no sales are recorded a mean or average between bid and asked will be taken, (3) official rate of exchange, $2.80 per pound sterling, will be utilized.

Biggest variations in contracts from this general formula will be in freight rate and allowances. These of course will differ with each location and the size of the purchase.

All is quiet on the Kennecott front. It seems likely that Kennecott's Braden Copper Co. will follow the Anaconda move. However, the paper work involved in establishing a formula which will be in line, is no doubt slowing up any announcement. The fact that nothing has been said as yet is added support for this outlook since Braden has had time to study and reject the system.

From across the sea comes news that seems to indicate that the Anaconda attempt for a world price may be working. It is still a bit too early to draw definite conclusions but the copper price on LME has been slowly but steadily heading down. It has dropped equivalent of about 4¢ since the Anaconda announcement, and the market seems to be easier.

NICKEL . . . Government will divert to industry 18 million lb of nickel originally scheduled for delivery to the stockpile during the second quarter. A major portion of the diverted nickel will be premium-priced ferronickel and nickel ingot.

In addition, customary sales to industry of 500,000 lb of nickel oxide a month from production at Nicaro, Cuba, will be continued, bringing to 19.5 million lb the total nickel being made available from government sources in the April-June quarter.

GOVERNMENT . . . The government has decided to allow copper producers an extra six months to deliver 36,000 tons of copper to national stockpiles.

The postponement is calculated to ease copper shortages confronting firms not holding defense contracts.

Deadline for delivery is now December 31, instead of June 30.

Previously-postponed deliveries of copper to government stockpiles account for 28,000 tons of the 36,000 ton total. The remaining 8000 tons was scheduled for shipment to stockpiles during the second quarter.

A plan covering deliveries of copper to the government in the future is now being worked out jointly by the U. S. Commerce Department and the General Services Administration, the Office of Defense Mobilization says. GSA has the responsibility of actual stockpiling and warehousing of copper and other scarce materials.

Export quotas for same period for copper raw materials, nickel and nickel products, and selenium generally will be unchanged from the present period.

Quotas for copper raw materials are: 3,000 short tons of new and old copper scrap; 9,400 tons, metal weight equivalent to about 6,000 tons copper content, for new and old copper-base alloy scrap with 40 pct or more copper; and 600 tons, metal weight, for copper-base alloy ingots and other crude forms.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Mar. 21	Mar. 22	Mar. 23	Mar. 24	Mar. 26	Mar. 27
Copper, electro, Conn.	46.00	46.00	46.00	....	46.00	46.00
Copper, Lake, delivered	46.00	46.00	46.00	....	46.00	46.00
Copper, Anaconda-Chilean	53.12	52.18	51.56	....	49.53	49.36*
Tin, Straits, New York	100.125	99.125	98.50	....	98.875	99.00*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices. **Tentative*

(Advertisement)

Inco high temperature research note:

Carburization

...and its effects on metals at high temperatures

With sufficient background of information on the strength properties and corrosion characteristics, it should be entirely possible to predict the performance of an alloy under any conditions of high temperature service.

Method of Obtaining Data

Data relating to the mechanical properties may be obtained in the laboratory by any of the conventional testing methods . . . on the other hand, the problem of high temperature corrosion resistance is often so complex that it is frequently more convenient to place test specimens in an actual service environment than to try simulating industrial conditions on a laboratory scale.

This course is being pursued by Inco's high temperature engineers working in the field and in laboratories at Bayonne, N. J. and Huntington, W. Va. Creep and rupture tests at temperatures as high as 2100°F have supplied data on the strength properties of high nickel alloys. Corrosive attack by various hot atmospheres, fused salts and molten metals is being studied principally in the field to provide the type of information that will assist industry to select more suitable, longer lasting materials for various high temperature applications.

Effects of Carburization

Carburization—as may result from contact with carbonaceous atmospheres in petro-chemical or petroleum refining operations or during the heat treatment of steel parts—is one type of high temperature reaction which, under certain conditions, can change the properties of heat resistant alloys and adversely affect their performance.

Carbon diffuses into the metal and subsequently precipitates as a carbide particle rich in chromium. Compared to the alloy matrix, the carbide phase is hard and brittle. If distributed throughout grain boundaries, the particles provide a continuous path for brittle failure. (See micrograph below.) In certain types of service, carburization of a heat-resisting alloy may not be a serious matter. But in the usual case where the metal part or structure may be called upon to exhibit some measure of ductility or be subjected to impact or to drastic temperature changes, carburization often leads to premature failure.

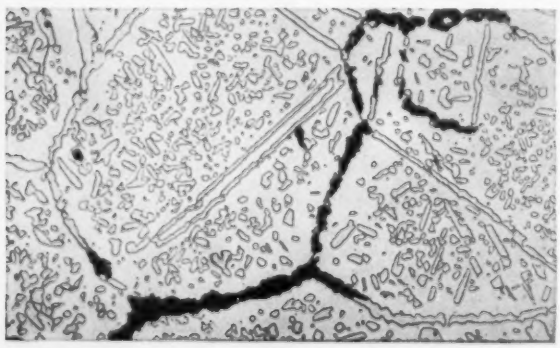
Nickel Plays Basic Role

In general terms, the susceptibility of iron-chromium-nickel alloys to carburization seems to depend upon the relative amounts of the individual components – but not as one might expect. Iron and chromium form stable carbides, while nickel does not. Yet Inco test data show that chromium has a greater effect than either iron or nickel. But it has also been demonstrated that for a given amount of chromium its beneficial effect is much greater at a higher nickel level than at a lower. Conversely, for given nickel content it would be expected that an alloy containing a higher chromium content would be more resistant to carburization.

Assistance Available

Inco high temperature corrosion test data also suggest that silicon improves carburization resistance, as does the presence of carbide stabilizing elements, such as titanium and columbium. Under extremely severe conditions of carburization, the effect of these elements is but temporary, and after sufficiently long exposure, their value is lost.

In a fast growing field such as this, it is impossible to have an immediate answer to every problem. But if high temperature performance is a problem to you, whether in present activities or in new projects, Inco High Temperature Engineers will do their best to help you. Let them send you the High Temperature Work Sheet . . . it is a big aid in getting the facts down clearly. Send for a copy now.



INCO

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

Please send me the High Temperature Work Sheet so that I may outline my problem to you.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

Nonferrous Prices *(Effective March 27, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1100, 3003	42.3	40.2	39.0	38.0
5052	49.8	44.9	43.2	41.4
6061-0	46.9	42.7	40.9	40.8

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6–8	43.1–44.8	58.1–61.7
12–14	43.8–45.2	59.0–63.3
24–26	46.8–47.2	69.2–73.6
36–38	55.1–55.7	92.0–95.8

Screw Machine Stock—2011-T-3

Size"	¼	⅜–⅝	¾–1	1¼–1½
Price	56.0	54.9	53.6	51.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length" →	72	96	120	144
.019 gage	$1.310	$1.742	$2.175	$2.605
.024 gage	1.630	2.177	2.707	3.247

MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type → Gage→	.250–3.00	.250–2.00	.125	.064	.032
AZ31A Stand. Grade	.....	61	63.5	78	99
AZ31A Spec.	.....	79	83	100	145
Tread Plate	64	.....	68	.....	.....
Tooling Plate	65	.....	.....	.....	.....

Extruded Shapes

	1" diam. rod	shapes lb/ft 0.3	1.0	4.0	2" OD x ⅛" W. tubing
Comm. Grade (FS)	61.50	65.4–72.4	61.9–67.3	57.7–62.2	74.5
Spec. Grade (AZ31B)	73	76.9–83.9	73.4–78.8	69.2–73.7	86

Alloy Ingot

AZ91B (Die Casting) ..... 31 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 36 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod, Bar, HR	87	74	93
Angles, HR	87	74	93
Plate, HR	97	87	95
Seamless tube	122	110	153
Shot, Blocks	...	71	...

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	70.63	.....	.....	70.32
Brass, 70/30	57.60	58.14	.....	60.51
Brass, Low	62.55	63.09	62.49	65.36
Brass, R L	64.34	64.88	64.28	67.15
Brass, Naval	60.70	65.96	55.01	63.86
Muntz Metal	58.74	52.75	54.55	.....
Comm. Bz.	66.68	67.22	66.62	69.24
Mang. Bz.	64.44	67.09	58.54	.....
Phos. Bz. 5%	88.22	85.87	88.72	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $13.10-$13.60; alloy $15.25-$15.75; Plate, HR, commercially pure, $10.50-$11.00; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.50-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.90-$8.15; alloy, $7.90-$8.10.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed 25.90
Aluminum pig 24.09
Antimony, American, Laredo, Tex. 33.50
Beryllium copper, per lb conta'd Be $43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $72.75
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Cobalt, 97-99% (per lb) ....$2.60 to $2.67
Copper, electro, Conn. Valley 46.00
Copper, Lake, delivered 46.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz. $ 2.25
Iridium, dollars per troy oz. $100 to $120
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Velasco, Tex., 10,000 lb, pig 32.50
ingot 33.25
Magnesium, sticks, 100 to 500 lb.... 53.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$258 to $260
Nickel electro 64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz. $23 to $24
Platinum, dollars per troy oz. $97 to $107
Silver, New York, cents per troy oz. 91.25
Tin, New York $99.00*
Titanium sponge, grade A-1 $3.15 to $3.45
Zinc, East St. Louis 13.50
Zinc, New York 14.00
Zirconium sponge $19.00
*Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot
No. 115 ..... 44.00
No. 120 ..... 43.00
No. 123 ..... 42.00
80-10-10 ingot
No. 305 ..... 47.75
No. 315 ..... 46.00
88-10-2 ingot
No. 210 ..... 60.75
No. 215 ..... 56.75
No. 245 ..... 50.75
Yellow ingot
No. 405 ..... 34.75
Manganese bronze
No. 421 ..... 39.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 31.50-32.50
0.60 copper max. 31.25-32.25
Piston alloys (No. 122 type)..32.50-33.50
No. 12 alum. (No. 2 grade)....30-00-31.00
108 alloy 30.00-30.50
195 alloy 31.50-32.50
13 alloy (0.60 copper max.).. 31.25-32.25
AXS-679 ..... 30.00-30.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 29.50-31.25
Grade 2—92-95% 29.00-30.25
Grade 3—90-92% 28.50-29.50
Grade 4—85-90% 28.00-29.00

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	45	44¼
Yellow brass	33¼	30¾
Red brass	39½	38¾
Comm. bronze	41¼	40½
Mang. bronze	30¾	30
Yellow brass rod ends	33	....

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 44½
No. 2 copper wire 43
Light copper 40½
*Refinery brass 40
* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 44½
No. 2 copper wire 43
Light copper 40½
No. 1 composition 37
No. 1 comp. turnings 36½
Hvy. yellow brass solids 27
Brass pipe 28
Radiators 28½

Aluminum

Mixed old cast. ..... 20 —21
Mixed new clips ..... 21 —22
Mixed turnings, dry..... 20½—21½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire. 43 —44
No. 2 heavy copper and wire 41 —41½
Light copper ..... 39 —39½
New type shell cuttings ..... 38½—39
Auto radiators (unsweated) 25½—26
No. 1 composition ..... 33½—34
No. 1 composition turnings .. 31 —31½
Unlined red car boxes ..... 26 —26½
Cocks and faucets ..... 27 —28
Clean heavy yellow brass .... 22 —23
Brass pipe ..... 27 —28
New soft brass clippings .... 28 —28½
No. 1 brass rod turnings .... 26 —26½

Aluminum

Alum. pistons and struts .... 17 —17½
Aluminum crankcases ..... 16¾—17¼
1100 (2S) aluminum clippings 19½—20
Old sheet and utensils ..... 16¾—17¼
Borings and turnings ..... 11½—12
Industrial castings ..... 16¾—17¼
2024 (24S) clippings ..... 18 —18½

Zinc

New zinc clippings ..... 8½— 9
Old zinc ..... 6 — 6½
Zinc routings 4⅛
Old die cast scrap 3½

Nickel and Monel

Pure nickel clippings $1.50
Clean nickel turnings $1.25
Nickel anodes $1.50
Nickel rod ends $1.50
New Monel clippings 60
Clean Monel turnings 50
Old sheet Monel 55
Nickel silver clippings, mixed. 25
Nickel silver turnings, mixed 21

Lead

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 7 — 7¼
Batteries, acid free 4½

Miscellaneous

Block tin ..... 84 —85
No. 1 pewter ..... 66 —67
Auto babbitt ..... 43½—44½
Mixed common babbitt 15½
Solder joints ..... 20 —20½
Siphon tops 50
Small foundry type ..... 16¼—16½
Monotype ..... 15½—16
Lino. and stereotype ..... 14½—15
Electrotype ..... 13 —13½
Hand picked type shells ..... 10½—11
Lino. and stereo. dross ..... 5¾— 6
Electro. dross ..... 4¾— 5

IRON AGE

STEEL PRICES

(Effective March 27, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B9*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1* *A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7* *A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M3*	6.35 *D1,D2, G3,M3,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C9*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P8*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *P3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*			6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C9*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	78.00 *K1*	94.00 *K1*	117.00 *K1*		5.30 *K1*	7.40 *K1*	5.45 *K1*	5.125 *K1*	8.00 *K1*	7.575 *K1*		8.95 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.875 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B3*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C8*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.075 *B3, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B3*					
SOUTH	Atlanta, Ga.								5.325 *A9*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			5.10 *C16* 4.60 *R3,T2*	6.75 *T2*		4.325 *R3,T2* 4.625 *C16*		6.425 *T2*			
	Houston, Lone Star, Tex.	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.875 *S2*		7.45 *S2*	

IRON AGE

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			5.375 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.375 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.30 *U1*	$8.00 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.475 *B3*	$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.675 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.55 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.55 *A1* 4.325 *W8*					6.375 *U1*				5.375 *N4* 5.375 *A5, R3*			
	Sterling, Ill.										5.475 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.375 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1, Y1*	5.325 *I3, U1, Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1, I3*	7.875 *U1, Y1*			5.375 *Y1*	$9.20 *I3, U1, Y1*	$7.90 *I3, U1, Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.			5.95 *C9*							5.475 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.525 *E2*			6.25 *E2*				*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3, N3*	5.325 *R3, N3*	5.85 *R3* 5.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa Midland, Pa. Butler, Pa.	4.325 *J3, U1, P6*	5.325 *J3, U1, P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.625 *P6* 5.375 *A5*	$9.20 *J3, U1*	$7.90 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.375 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5, F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.375 *Y1*			
WEST	Fontana, Cal.	5.125 *K1*	6.525 *K1*				7.175 *K1*	9.075 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.625 *S2*			
	Los Angeles, Torrance, Cal.										6.175 *B2*			
	Minnequa, Colo.										5.625 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.825 *R3*, 5.375 *T2*	$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.625 *S2*			

IRON AGE

STEEL PRICES

(Effective March 27, 1956)

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		BARS						PLATES				WIRE
		Carbon Merchant	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	6.30 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.60 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Coatesville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *P2*	5.575 *C3*			
	Hartford, Conn.			6.75 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.60 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.70 *W10*		7.60 *W10*						
	Camden, N. J.			6.70 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.80 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.70 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	4.80 *M7*	4.80 *M7*	6.70 *W11* 6.45 *C14* 6.70 *B5*		7.725 *A5,B5*		4.50 *R3*				6.90 *A5* 6.90 *W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.775 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		6.25 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E7*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3,* 5.15 *P13*	4.65 *N4,R3,* 5.15 *P13*	6.25 *B5,W8, W10,A5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,R3* 4.725 *A1*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.60 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	6.25 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.60 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.60 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.45 *B5* 6.15 *P3* 6.10 *P8*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3, P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.60 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	6.25 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.70 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.70 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		6.25 *C10*	5.575 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	6.25 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.60 *A5,J3, P6*
	Portsmouth, Ohio											6.60 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	6.25 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10, F2*	6.80 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.60 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.20 *K1*		7.00 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.85 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.70 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.55 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.85 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.55 *C7* 7.55 *C6*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.80 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,R3* 5.15 *C16*	4.65 *T2,R3* 5.15 *C16*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.60 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		6.40 *S2*	6.825 *S2*	6.85 *S2*

Steel Prices *(Effective March 27, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit.
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Stee Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Forth Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton

	BUTTWELD														SEAMLESS							
	½ In.		⅜ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Youngstown *R3*	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75								
Fontana *K1*	6.00	13.25	9.00	+9.25	11.50	+5.75	14.00	+4.00	14.50	+3.00	15.00	+2.50	16.50	+1.75								
Pittsburgh *J3*	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Sharon *M3*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Fairless *N2*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Pittsburgh *N1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Wheatland *W4*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Youngstown *Y1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75								
Lorain *N2*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Youngstown *R3*	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75								
Fairless *N2*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Fontana *K1*	10.50		14.50		16.50		17.00		17.50		18.00		18.50									
Pittsburgh *J3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Sharon *M3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Pittsburgh *N1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Wheatland *W4*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Youngstown *Y1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Lorain *N2*	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ⅛, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	1	1.5	8	—	.96
6	4	3	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium ..... .77
Oil hardened manganese ..... .43
Special carbon ..... .39
Extra carbon ..... .33
Regular carbon ..... .275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 33.00; 1 side, 30.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.40	8.60	....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain Oriented	
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G7*); Indiana Harbor (*I3*); Mansfield (*E7*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*)
* Coils 75¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Cal	Woven Wire Fence 9-15½ ga. Cal	"T" Fence Posts Cal	Single Loop Bale Ties Cal	Galv. Barbed and Twisted Barbless Wire Cal	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	152	162	...	173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162	...	...	...	7.40	7.80
Atlanta *A8*	154	167	...	175	180	7.50	8.025
Bartonville *K2**	154	168	...	175	181	7.50	8.10
Buffalo *W6*	...	...	...	...	...	7.40	7.80
Chicago, Ill. *N4***	152	166	...	173	179	7.40	8.00
Cleveland *A6*	157	...	...	...	...	7.50	....
Cleveland *A5*	...	...	...	...	...	7.40	....
Crawfordsville *M4**	154	167	...	175	175	7.50	8.05
Donora, Pa. *A5*	152	162	...	175	175	7.50	7.90
Duluth *A5*	152	162	...	175	175	7.50	7.90
Fairfield, Ala. *T2*	152	162	...	175	175	7.50	7.90
Galveston *D4*	157	...	...	...	...	...	....
Houston *S2*	157	170	...	...	180	7.65	8.05
Johnstown, Pa. *B3**	152	166	...	...	175	7.40	7.80
Joliet, Ill. *A5*	152	162	...	175	175	7.50	7.90
Kokomo, Ind. *C9*	154	154	...	175	177	7.50	7.90
Los Angeles *B2**	...	...	...	...	...	8.35	8.925
Kansas City *S2*	157	167	...	178	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162	...	...	...	7.40	7.80
Moline, Ill. *R3*	...	162	162	...	...	...	....
Pittsburg, Cal. *C7*	171	185	...	199	195	8.45	8.85
Portsmouth *P7*	...	...	...	...	...	7.40	....
Rankin, Pa. *A5*	152	162	...	...	175	7.40	7.90
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*	...	...	...	197	195	8.35	8.75
Sparrows Pt. *B3**	154	...	...	175	181	7.50	8.075
Struthers, O. *Y1*	...	...	...	...	...	7.40	7.90
Worcester *A5*	158	...	...	...	...	7.70	8.20
Williamsport, Pa. *S5*	...	...	160	...	...	...	....

Galvanized products computed with zinc at 5¢ per lb
Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bristol, Conn. *W12*	...	...	10.80	12.95	15.65
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*	...	9.05	10.60	12.75	15.35
Cleveland *A5*	7.10	9.05	10.60	12.75	15.45
Detroit *D1*	7.20	9.15	10.70	12.85	....
Detroit *D2*	7.20	9.15	10.70	...	....
Harrison, N. J. *C11*	...	...	10.90	13.05	15.75
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	....
New Haven, Conn. *D1*	7.55	9.35	10.90	13.05	....
Pawtucket, R. I. *N7*	7.65	9.35	10.90	13.05	15.75
Pittsburgh *S7*	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. *A1*	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. *S1*	7.10	9.05	10.60	12.75	15.45
Trenton *R4*	...	...	...	...	....
Wallingford *W1*	7.45	9.25	10.80	12.95	15.65
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50	...	....
Worcester, Mass. *A5*	7.65	9.35	10.90	13.05	15.75
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.93	....
	2½	12	41.57	49.16	40.31	....
	3	12	47.99	56.76	46.55	....
	3½	11	56.03	66.27	54.34	....
	4	10	74.41	88.00	72.17	....
National Tube	2	13	30.87	36.51	29.93	....
	2½	12	42.57	49.16	40.31	....
	3	12	47.99	56.76	46.55	....
	3½	11	56.03	66.27	54.34	....
	4	10	74.41	88.00	72.17	....
Pittsburgh Steel	2	13	30.87	36.51	....	....
	2½	12	41.57	49.16	....	....
	3	12	47.99	56.76	....	....
	3½	11	56.03	66.27	....	....
	4	10	74.41	88.00	....	....

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery Charge	Sheets Hot-Rolled	Sheets Cold-Rolled	Sheets Galvanized (10 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore	$.10	7.31	8.32	8.37	7.65	.....	7.63	7.93	7.61	8.62	14.38	13.44–13.96	16.36	16.29–16.49
Birmingham	.15	6.80	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	8.22	9.17	10.42	8.31	.....	8.51	8.37	8.37	9.83	.....	13.66	.....	16.76
Buffalo	.15	7.35	8.40	10.16	7.50	.....	7.80	7.75	7.50	8.05	.....	13.45	.....	16.50
Chicago	.15	7.28	8.39	9.25	7.36	.....	7.60	7.58	7.42	7.90	.....	13.20	.....	16.30
Cincinnati	.15	7.40	8.38	9.10	7.60	.....	7.89	8.05	7.66	8.30	13.59	13.29	16.44	16.39
Cleveland	.15	7.28	8.39	9.10	7.46	.....	7.77	7.91	7.48	8.15	13.41	13.11	16.26	16.21
Denver		8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.62	.....	.....	.....	17.97
Detroit	.15	7.47	8.58	9.53	7.49	.....	7.88	8.05	7.70	8.19	13.70	13.40	16.55	16.50
Houston		7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85–9.95	14.35	14.00	17.15	17.05
Kansas City	.20	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.25	10.10	11.10	8.60	.....	8.85	8.40	8.25	11.00	.....	14.45	.....	18.00
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.15	7.37	8.48	9.34	7.45	.....	7.69	7.75	7.51	8.09	.....	13.29	.....	16.39
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.84	8.94	9.60	8.27	.....	8.27	8.19	8.21	9.82	.....	13.53	.....	16.63
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.44	8.54	9.51	8.09	.....	7.82	7.85	7.83	8.62	.....	13.35	.....	16.45
Pittsburgh	.15	7.28	8.39	9.55	7.46	9.00	7.60	7.58	7.42	8.00	13.35	13.05	16.20	16.15
Portland		7.80–8.60	8.80–10.15	10.65	8.00	7.95	7.75	7.85–8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.30	9.75	10.25	8.45	.....	8.40	8.35	8.25	11.55	.....	14.45	.....	18.00
Seattle	.00	8.75	10.40	10.90	8.90	.....	8.50	8.50	8.60	12.25	.....	14.65	.....	.....
St. Louis	.15	7.57	8.68	9.54	7.65	.....	7.89	7.98	7.71	8.44	.....	13.49	.....	16.59
St. Paul	.25	7.94	8.59–9.14	9.89	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.
*Plus analysis charge. ‡Deduct for country delivery.

(Effective March 27, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Unireated
Bessemer *U1*	4.725	5.65	5.825				
So. Chicago *R3*				8.05			
Ensley *T2*	4.725	5.65					
Fairfield *T2*		5.65		7.90		5.625	
Gary *U1*	4.725	5.65				5.625	
Ind. Harbor *I3*	4.725		5.825	7.90		5.625	
Ind. Harbor *Y1*				7.90			
Johnstown *B3*		5.65					
Joliet *U1*		5.65	5.825				
Kansas City *S2*				7.90			
Lackawanna *B3*	4.725	5.65	5.825			5.625	
Lebanon *B3*							12.15
Minnequa *C6*	4.725	6.15	5.825	7.90		5.625	12.15
Pittsburgh *O1*					11.90		12.15
Pittsburgh *P5*							12.15
Pittsburgh *J3*				7.90			
Seattle *B2*				8.40		5.775	12.65
Steelton *B3*	4.725		5.825			5.625	
Struthers *Y1*				7.90			
Torrance *C7*						5.775	
Williamsport *S5*		5.65					
Youngstown *R5*				8.05			

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$28.75
Chicago, f.o.b.	27.00
Detroit, f.o.b.	27.50
New England, del'd	28.55
Seaboard, N. J., f.o.b.	26.75
Philadelphia, f.o.b.	26.50
Swedeland, Pa., f.o.b.	26.50
Painesville, Ohio, f.o.b.	27.50
Erie, Pa., f.o.b.	27.50
Cleveland, del'd	29.43
Cincinnati, del'd	28.59
St. Paul, f.o.b.	26.50
St. Louis, f.o.b.	28.50
Birmingham, f.o.b.	25.65
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
5	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	58.92
Electrodeposited	55.25
Brass, 80-20, ball anodes, 2000 lb or more	58.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 2¢ per lb)	20.75
Nickel, 99 pct plus, rolled carbon (rolled depolarized add 3¢ per lb)	90.50
Cadmium	$1.70
Tin, ball anodes and elliptical	$1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	83.50
Copper sulphate, 5 or more 100 lb bags, per cwt	18.15
Nickel salts, single, 4-100 lb bags	33.25
Nickel chloride, freight allowed, 300 lbs	43.50
Sodium cyanide, domestic, fob N. Y. 1 to 4 200 lb drums (Philadelphia add .50 per lb)	21.55
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1 to 20 100 lb drums	31.20

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case Quantity	Full case 20,000 lb. or more
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex, HP, reg. & hvy.

¾" or smaller	64	66
⅞" to 1⅛" inclusive	63	65
1¼" to 1½" inclusive	65	67
1⅝" and larger	61	63

C.P. Hex regular & hvy.

¾" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex Nuts

¾" and smaller	66	66
⅞" and larger	63	63

Add 25% for less than case or keg quantity.

Rivets

	Base per 100 *lb*
½ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	32

Cap Screws

	Discount Bright	H.C. Heat Treated
New std. hex head, packaged ¼" thru ½" diam. x 6" and shorter	34	20
9/16" and ⅝" x 6" and smaller and shorter	31	16
¾", ⅞", 1" x 6" and shorter	9	+11
New std. hex head, bulk* ¼" thru ½" diam. x 6" and shorter	49	41
9/16" and ⅝" diam. x 6" and shorter	43	39
¾", ⅞", 1" x 6" and shorter	31	20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Quantity	*Discount* Mach. Screws	Stove Bolts
Packaged, package list		27	38
Bulk, bulk list			
¼-in. diam. & under	25,000-200,000	20	61
5/16-in. diam. & larger	15,000-100,000	20	61
All diam. over 3 in. long	5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

	Quantity	*Discount* Hex	Square
Packaged, package list		24	27
Bulk, bulk list			
⅜-in. diam. & smaller	25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	109.3
New York	121.5
Chicago	122.9
San Francisco-L. A.	131.1

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick	*Carloads per* 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	114.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	98.00
No. 2 Ohio	18.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	138.00
Chicago District	138.00
Western Utah	144.00
California	151.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O. Curtner, Calif.	145.00 163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	32.00

Chrome Brick	*Per net ton*
Standard chemically bonded, Balt.	$91.00
Standards chemically bonded, Curtner, Calif.	101.25
Burned, Balt.	85.00

Magnesite Brick	
Standard Baltimore	$114.00
Chemically bonded, Baltimore	102.00

Grain Magnesite	St. ¾-in. grains
Domestic, f.o.b. Baltimore in bulk fines removed	$64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	40.00
in sacks	46.00

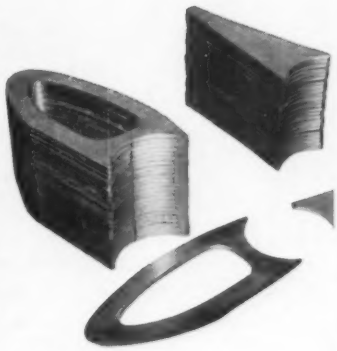
Dead Burned Dolomite	*Per net ton*
F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$15.00
Midwest	15.60
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	9.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe.	86.0¢ to $1.55
Aluminum freight allowed	34.50¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	61.50¢
Copper, reduced	61.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd	$5.00
Lead	7.50¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.00 to $3.25
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed, #80	$1.18
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	18.75¢ to 32.50¢

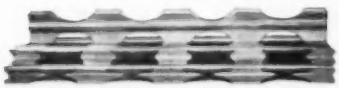
Blank size: ⅜" thick x 16½" x 23½"



Blank size: ⅜" thick x 9" x 31"

Blank size: 5" thick x 78" OD

Blank size: 4" thick x 7¾" x 71⅜".
Illustrations show before and after machining.



All the products illustrated here were flame cut, sawed, abrasive cut, sheared or machined from stainless steel plate.

Blank size: 2" thick x 60" OD

Stainless steel plate produced to your specifications for quick delivery

Confidence in Carlson service has made G. O. Carlson, Inc. the country's leading specialist in stainless steel plate. As we grew to this position in the industry, we learned and developed new methods of working stainless plate.

What does this mean to you?

It means you can buy for quick delivery exactly what you need in stainless steel plate—sheared, sawed, flame cut, abrasive cut, or machined. And this is true whether the job is a "toughy" or "run of the mill"!

When you need stainless steel plates—special patterns like these or plain rectangles—you'd better try Carlson service, where experience pays off.

write for CARLSON'S WEEKLY STOCK LISTS . . .
YOUR GUIDE TO WHAT'S AVAILABLE
IN QUALITY STAINLESS STEEL

Stainless Steels Exclusively

G. O. CARLSON, INC.

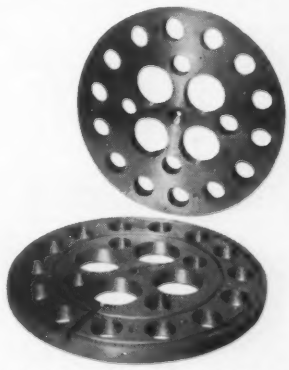
THORNDALE, PENNSYLVANIA

Plates • Plate Products • Forgings • Bars • Sheets (No. 1 Finish)

District Sales Offices in Principal Cities

Blank size: 3⅛" thick x 106½" OD

Blank size: ¼" thick x 75" x 88"



Blank size: 1½" thick x 26" OD

Ferroalloy Prices

(Effective March 27, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	38.50	0.20% C	35.50
0.03% C	38.00	0.50% C	35.25
0.06% C	36.50	1.00% C	34.00
0.10% C	36.00	1.50% C	33.85
0.15% C	35.75	2.00% C	33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si ... 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si ... 25.00
0.025% C (Simplex) ... 31.75

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe	1.36

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed. 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	1.25
Ton lots	1.27
Less ton lots	1.29

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.75
Johnstown, Pa.	10.25
Sheridan, Pa.	10.25
Philo, Ohio	10.25
S. Duquesne	10.25

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.00
Ton lots packed	15.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$92.00
19 to 21%	3% max.	94.00
21 to 23%	3% max.	96.50

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	31.50
Ton lots	33.50
250 to 1999 lb	35.50
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn. ... 22.85

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	34.00	35.55	36.75
0.07% max. C	31.95	33.50	34.70
0.10% max. C	30.20	32.75	33.95
0.15% max. C	29.45	32.00	33.20
0.30% max. C	27.95	30.50	31.76
0.50% max. C	27.45	30.00	31.20
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	24.45	27.00	28.20

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carload bulk	12.00
Ton lots	13.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	13.55
Ton lots, packed	15.75

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $98.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	7.15
Ton lots, packed	9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	12.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
	90% Si	18.50	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo ... $1.34

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta ... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo ... $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton ... $90.00
10 tons to less carload ... $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.35

Ferrotitanium 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.50
Less ton lots ... $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ... $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, delivered ... $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. ... $1.32
bags, f.o.b. Washington, Pa., Langeloth, Pa. ... $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ... $1.33

Zirconium contract basis, per lb of alloy
35-40%, f.o.b. freight allowed, carloads, packed ... 26.25¢
12-15%, del'd, lump, bulk-carloads ... 8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B 3.14%, Si 40-45%, per lb contained 2 ... $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ... 45¢
Less ton lots, per pound ... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ... 10.00¢

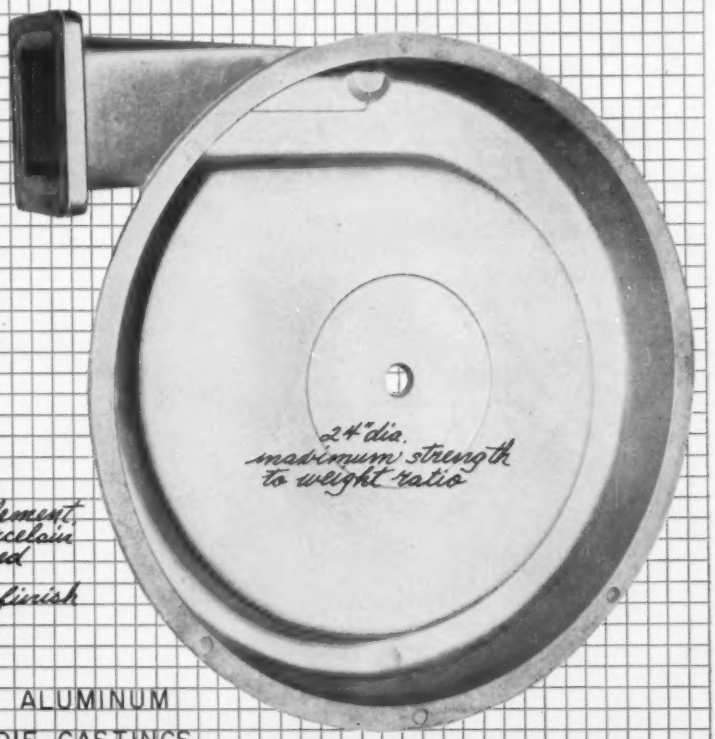
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.20
F.o.b. Wash., Pa.; Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ... .85
14 to 19% B ... 1.20
19% min. B ... 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over
No. 1 ... $1.05
No. 79 ... 50¢

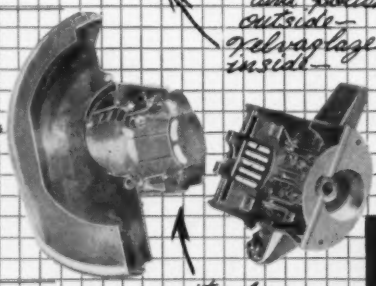
Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
D, del'd.
Ton lots ... $1.46
Less ton lots ... 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... $2.05

ALUMINUM
PERMANENT MOLD

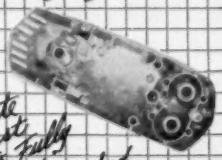


Cast-in element colored porcelain and polished outside—Velvaglaze finish inside—

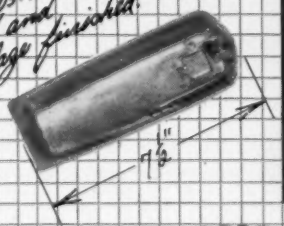


ALUMINUM
DIE CASTINGS

2 units of multiple assembly Durable inexpensive Velvaglaze castings



Intricate housing cast in 2 parts fully machined and Velvaglaze finished.



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MONARCH ALUMINUM MFG. COMPANY
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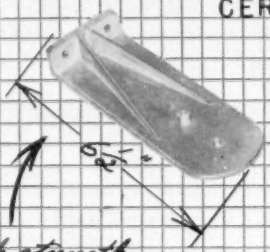
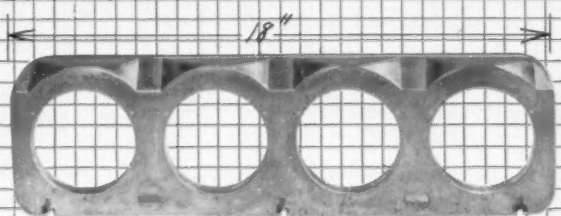
CERTIFIED ZINC CASTINGS



high strength—
dimensional accuracy



accurately cast and machined for reduced assembly cost—

® Reg. T. M.

If you're stuck with high costs...

think of your Kaiser Aluminum

LET YOUR Kaiser Aluminum Distributor free you from costly storage expenses. It's simple—just draw from his stock as you would from your own.

By using his warehouse, you can reduce your overhead through lower insurance and taxes, less accounting, less material damage and lower handling costs. You can also eliminate unnecessary metal-working equipment and reduce scrap handling because he can supply aluminum cut to your needs.

And you can rely on your Kaiser Aluminum Distributor to do everything possible to fill your emergency orders the minute you call!

In addition, he's had wide experience in the metals field and can give you expert advice and help on your manufacturing problems. He can specify the exact type of aluminum your product requires. He can suggest methods of using aluminum more economically. He can supply you with small quantities for experimental work.

All these services mean more profits for you because they lower your cost!

Take advantage of the personalized service offered you by your Kaiser Aluminum Distributor. Call him today!

ATLANTA, GEORGIA
Warehouse Division, Atlantic Steel Co. Phone: Emerson 3451
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Hill-Chase Steel Co. of Maryland Phone: Peabody 2-7300
BEAUMONT, TEXAS Standard Brass & Mfg. Co. Phone: 4-2641
BOSTON METROPOLITAN AREA
Hawkridge Bros. Co. Hubbard 2-8600
Zurbach Aluminum Co. Phone: Monument 6-1400
CHICAGO METROPOLITAN AREA
Fullerton Steel & Wire Co. Phone: Merrimac 7-2700
Korhumel Steel & Aluminum Co. Phone: Ambassador 2-6700
Evanston, Illinois
Miratile Mfg. Company Phone: Hudson 8-2200
(Serves House Trailer Industry only)
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CLEVELAND, OHIO
Copper & Brass Sales, Inc. Phone: Endicott 1-6757
Nottingham Steel & Aluminum Company Phone: Atlantic 1-5100
DALLAS, TEXAS
Delta Metals, Inc. Phone: Logan 7443
Earle M. Jorgensen Co. Phone: Riverside 1761
DAVENPORT, IOWA
Nichols Wire & Aluminum Co. Phone: 3-1895
DETROIT, MICHIGAN
Alloy Steels, Inc. Phone: Texas 4-3890
Copper & Brass Sales, Inc. Phone: Lorain 7-3380
GRAND RAPIDS, MICHIGAN
Copper & Brass Sales, Inc. Phone: Empire 1-6681
HONOLULU, T. H. Permanente Cement Co. Phone: 5-2541
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Earle M. Jorgensen Co. Phone: Orchard 1621
Standard Brass & Mfg. Co. Phone: Capitol 5-6531
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Hubbell Metals Inc. Phone: Walnut 5-9261
F. H. Langsenkamp Company Phone: Imperial 4321
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Korhumel Steel & Aluminum Corp. of Wis. Phone: Evergreen 4-6000
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Korhumel Steel & Aluminum Co. Phone: Geneva 2661
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Orleans Steel Products Co., Inc. Phone: Raymond 2116
Standard Brass & Mfg. Co. Phone: Audubon 1381
NEW YORK METROPOLITAN AREA
T. E. Conklin Brass & Copper Co., Inc. Phone: Walker 5-7500
A. R. Purdy Company, Inc., Lyndhurst, N. J.
Lyndhurst: Phone Webster 9-8100 New York: Phone Chelsea 3-4455
Newark: Phone Humboldt 2-5566

Distributor

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Gilmore Steel & Supply Co. Phone: Glencourt 1-1680
Earle M. Jorgensen Co. Phone: Higate 4-2030
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Hill-Chase & Company, Inc. Phone: Delaware 6-5400
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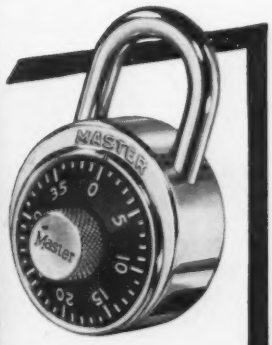
Multiple steel plates . . . stronger than a solid block! Genuine brass-cylinder, pin-tumbler security. No finer padlock protection!



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Double-wall construction . . . 3 number brass locking mechanism. Available with "Key-Control" — one control key opens all locks.

Typical industrial uses for MASTER PADLOCKS

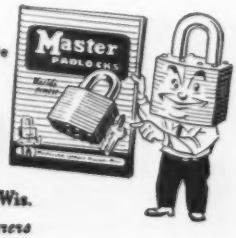
Master's complete line offers you the world's finest padlock security *. . . for every protection need!*

Here are just a few of the Master features and services that make your protection problems easier:

- Special long or short shackle styles.
- Steel or brass cases.
- Quick delivery on keyed alike or master-keyed sets.
- Chain fittings for all styles.

Available from your Industrial Supply or Hardware wholesaler.

Write for FREE Catalog of complete Master line . . .



Master Padlocks

Master Lock Company, Milwaukee 45, Wis.
World's Largest Padlock Manufacturers

Exclusive New England Agent for all products of Cleveland Cap Screw Co.

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FOR FINER FORGINGS AND FASTENERS, let RITCO meet your design requirements . . . save you machining time and money!

Clean, accurate RITCO Forgings . . . Drop or Upset . . . are made to blueprint specifications in many metals and in weights from ¼ to 15 pounds. Their smooth, flash-free finish and tremendous strength make them ideal for a wide variety of uses.

RITCO also makes Special Fasteners and finished bolts and offers complete machining facilities. Ask for prices or a sample RITCO Forging.

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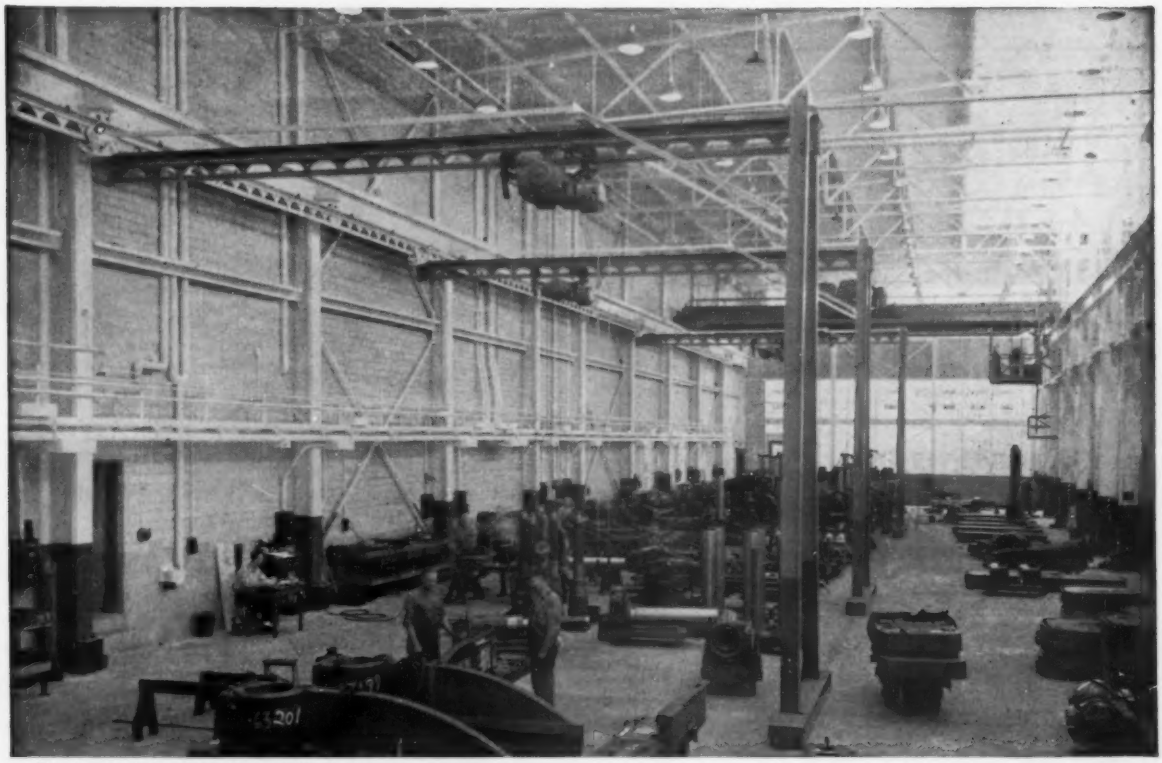
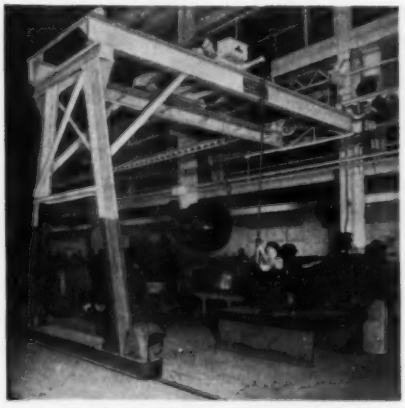


Single bridge, hand-propelled gantries with electric hoists operating under heavy overhead crane in a machine tool plant.



Double girder, completely motorized gantry. Because gantries ride on a floor rail and one wall rail, their use often eliminates need of long span overhead cranes.

GANTRY CRANES BOOST PRODUCTION

IT is not unusual for skilled workers to wait 5 or 10 minutes and more in many shops for crane service. By providing a sufficient number of gantry cranes, much or all of this lost time can be eliminated and production aided.

Efficiency usually can be greatly improved by providing one large overhead crane for each shop bay — for the heavy lifting and transportation from one end of bay to the other — and a number of gantries to work under it, to do the light local or spot handling.

Several Cleveland Tramrail gantries generally can be purchased for the price of a large overhead crane and are available for manual or electric operation.

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For All Types of Cars

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"ANYTHING containing IRON or STEEL"

THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Detroit Sales Holding . . . Used machinery business in the Detroit area is holding up very well despite a slight dip in activity in recent weeks.

Dealers blame the lag in business on the automotive cutbacks here, but it's generally believed that the period of adjustment has now passed. Most dealers say they're looking forward to a step up in activity at least through the month of June.

The slight overall sales downturn currently in effect hasn't as yet trickled down to tool room equipment. Dealers say the demand for this type of machinery has continually exceeded the supply since last December and there is no letup in sight.

Automotive Business Strong . . . Most dealers are still feeling the effects of the huge automotive programs for 1957 that are now in full swing operation.

There's a steady scramble, it's pointed out, for all kinds of presses, boring mills, lathes and shapers.

The heavy demand from other areas indicates that this type of equipment is in short supply all over the country. The number of outside inquiries, dealers note, is increasing every day.

Gov't Contracts Mount . . . Another factor which is adding to the general consumer need for late-type presses, boring mills, lathes and shapers is the gradual increase in the number of government contracts coming into the area.

The most recent one has gone to Studebaker-Packard Corp. for the production of component parts on the J-57 jet engine.

Small Job Shops Play Important Role . . . The major source of business for many customers in the area are the smaller job shops.

These are the firms that started in business with relatively little new equipment for sale. Most of their inventory consisted of older pieces of equipment which, in the tight supply market recently prevailing, sold well. Now, they're in a more favorable position and can afford more recent items currently in demand.

New Machinery Deliveries Slow . . . Quite a few inquiries are also coming into dealers from larger companies in the area which simply can't afford to wait any longer for new machinery.

Delivery time of new machines has reached the point where some manufacturers are forced to take what they can get in the way of good condition used equipment.

This is especially true with respect to older presses, boring mills, lathes and shapers.

A considerable number of local dealers, both the larger and smaller firms, point out that they're not too much concerned at the moment about the lag in activity for other lines of machinery.

Backstopping the apparent lack of worry in many quarters are the statistics which dealers cite showing that the amount of business has increased progressively for each quarterly period last year.

And, they're confident, they add, that the first quarter of this year will be better than the same period a year ago.

Why The Optimism? . . . Current dealer optimism, it should be noted, is due mainly to the increasing activity in the automobile industry.

With auto production and sales both starting to increase, dealers figure that used machinery buyers are going to be more willing to invest their money in most types of good used items. Trend will hold most of the year.

CONSIDER GOOD USED EQUIPMENT FIRST

BALERS
Logemann Baler, Charging Box 60"x18"x16", Produces Bale approx. 100 lbs.
Logemann Baler, Charging Box 72x12x18", Produces 300 lb. Bale

BENDING ROLLS
8' x ⅝" Hilles & Jones Pyramid Type
14' x 3/16" Hilles & Jones Pyramid Type
16' x ¾" Bertsch Initial Type Bending Roll
20' x ⅜" Bertsch Pyramid Type
24' x ½" Hilles & Jones Pyramid Type

BRAKES—LEAF TYPE
12' x ⅜" Dreis & Krump
12' x ½" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
10' x ⅝" Cincinnati
14' x ½" Cincinnati Series 120-14

BULLDOZERS
#5 Williams & White, 20" Stroke, 11⅛" x 63" Face of Crosshead
#27 Williams & White, 22" Stroke, 16" x 80" Face of Crosshead

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	29' Span 230 Volt D.C.
5 ton P&H	80' Span 220/3/60 A.C.
5 ton Cleveland	96' Span 230 Volt D.C.
7½ ton P&H	65' Span 440/3/60 A.C.
7½ ton Bedford	70' Span 440/3/60 A.C.
10 ton Milwaukee	80' Span 230 Volt D.C.
10 ton P&H	96' Span 220 Volt D.C.
20 ton Toledo	75' Span 550/3/60 A.C.
120 ton Whiting	80' Span 220/3/60 A.C.

FORGING MACHINE
1" to 5" Acme, Ajax, National

FURNACES
30" x 36" L&N Homo Carb Pit Type Furnace, Electric Fired 100 KW 220/440/3/60
Heat-Duty Electric Furnace, Hot Zone 18" high, 26" Wide Opening, 10'9" Deep I.D.
Sunbeam, Stewart Gas Fired Furnace 12" x 36" x 36" 15 ton Heroult Top Charge

GRINDER—ROLL
20' x 96" Landis, With Crowning Attachment

HAMMERS BOARD DROP—STEAM DROP STEAM FORGING—800 lb. to 20,000 lb.

HAMMERS—MISC.
#3B Lobdell Nasel, Capacity 4" Square
2000 lb. Chambersburg Ceco-Drop

LEVELERS—ROLLER
18" United, 13 Rolls 1½" Dia.
52" McKay, 17 Rolls 3⅝" Dia.
90" Budd-McKay Sheet Processor & Leveler, Leveling Rolls 3⅝" dia.
96" Aetna-Standard, 19 Rolls 2½" Dia.

PLANERS—PLATE EDGE
30' x 1¼" Southwark, 16 Pneumatic Jacks
35' x 1⅛" Southwark, 16 Pneumatic Jacks

PRESS—GAP FRAME
125 ton Beatty Inclined Open Back Gap Press, Stroke 1½". Bed Area 28⅞" x 26⅞" (New)

PRESSES—HYDRAULIC
530 ton Baldwin Southwark 12" Stroke 48" x 25" Between Columns
800 ton Clearing 48" Stroke, Bed Area 48" x 48"
1000 ton Lake Erie Double Acting 46" Stroke. Bed Area 72" x 146"
1257 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
4500 ton B-L-H Hydr. Forging Press

PRESSES—STRAIGHT SIDE
#8½ 4P Zeh & Hahnemann Percussion Press 75 ton Clearing Model TF41500-200 Triple Acting, Strokes 40, 32, 14". Bed Area 100" x 200"

PUNCH & SHEAR COMBINATIONS
No. 2⅝" Bu..alo Ironworker, Capacity Punch 1 5/16" thru 1" Shear Angles 6 x 6 x ½", Round 2¼" Square 2", etc. With Coper & Notcher
Style EF Cleveland 60" Throat, Punch 1¼" thru 1"
Style EF Cleveland 36" Throat, Punch 1¼" thru 1"
Style W Cleveland 60" Throat, 312 Ton

ROLLS—PLATE STRAIGHTENING
60" McKay Universal, 7 Rolls 10" Dia.
72" Bertsch Seven 7" Dia. Rolls

ROLLING MILLS
12" x 16" Phila., Single Stand, Two High
15" x 28" Farrel Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 21" Farrel Single Stand, Two High
22" x 12" x 40" Lewis 3-High Sheet Mill
12" Three High Bar Mill

ROLLS—FORMING
8 Stand Rafter Tube Forming Machine, Spindle 1⅞"
5 Stand Bliss Roll Forming Machine, Shaft 2⅝"

SHEARS—GATE
80" x ⅝" Pels
86" x 1" Hilles & Jones

SHEAR—ANGLE
6 x 6 x ⅝" Cleveland

SHEARS—SQUARING
12' x 3/16" Cincinnati #1412
12" x ⅝" Steelweld

SLITTERS
G-48 Yoder Gang Slitter, 5" Threaded Arbor
3-30 Yoder Slitter, 7" Plain Arbor

STRAIGHTENERS
Kane & Roach 2 Roll Rotary Straightener. M.D. Capacity Mildsteel ¼" to ⅞"
Aetna-Standard 12 Roll, Capacity 2¼" O.D. Tubing

TESTING MACHINES
100,000, 200,000# Olsen & Riehle Universal; 50,000 & 300,000# Compression

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ELECTRIC POWER EQUIPMENT

D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3000	Whse.	Tandem	550	600
1	2200	G.E.	MCF	600	400/500
2	1500	Whse.	Rev.	600	600
1	1200	G.E.	MCF	600	650/800
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	QM	250	140/170
1	800	Whse.		250	450/550
1	600	Al. Ch.		250	400/800
1	500	Whse.	CC-216	600	300/900
1	500	G.E.	MCF	230	250/750
3	450	Whse.		550	415
1	250	G.E.	MPC	230	400/600
1	200	G.E.	CD-1650Z	230	500/1500
1	200	Whse.	CB-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
2	150	Cr. Wh.	83H-TEFC	230	890
1	150	Whse.	8K-151B	230	900/1800
1	150	Whse.	8K-201	230	360/950
1	120	G.E.	MCF	230	250/1000
1	125	Whse.	8K-183	230	850
1	100	Rel.	1050T	230	400/1200
2	100	Whse.	8K-181	230	450/1000
2	75	C.W.	53H-TEFC	220	860
1	50	G.E.	MD-412AE	220	550

M-G Sets—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
1	3000(3U)	G.E.	514	600	4000/6900/13200
1	2500(3U)	Whse.	720	600	2300
2	2000/2400	G.E.	450	250/300	2300/4600
1	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	500 25cg	600	1100
1	2000	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1250	Whse.	720	600	2300
1	750	Whse.	900	250	2300/4000
1	500	Whse.	900	125/250	440
1	200	Whse.	1200	250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	2500	A.C.	OA	3	6900/11900x2400/4160Y
3	1000	G.E.	HVDDJ	1	2400x480
6	1000	Wagner	OISC	1	13200x460
3	667	G.E.	HD	1	13800x2300
3	333	G.E.	HS	1	7200x2400/4160Y
3	333	G.E.	HD	1	13200x2300
3	333	G.E.	HSWR	1	2300/4000x230/450
3	250	Penn.	DISC	1	34500x120/240

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4000# Niles Bement Double Frame Steam Forge Hammer

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Nazel Air Forging Hammers, #2-B, 4-B, 5-N

Williams White Bulldozers, #22, #3, #4, #25, #6, #29 U-type

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Multiple Punches

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Qu.	H.P.	Make	Type	Volts	R.P.M.
2	3000	Whse.	Mill	525	600
6	1500	Whse.	Mill	525	600
1	1250	G.E.	MCF	600	350/790
4	800	Whse.	Encl.	525	600
4	700	Whse.	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
2	500	Whse.	Mill	250	285/710
1	450/250	Al. Ch.	Mill	375/250	250/1000
1	450	Whse.	SK	230	450/600
1	350	G.E.	CD-169	230	1150
1	200/250	El. Dy.	Ped. Brg.	230	400/1200
1	200	Whse.	SK-210	230	400/800
1	180	G.E.	MPC	230	400
1	150	Whse.	SK-201	230	300/900
2	125	Whse.	SK-184	230	575/850
1	125	G.E.	MPC	230	400/600
1	100	El. Dy.	30-S	230	450/1350
2	100	El. Dy.	30-S	230	475/950
1	80	Reliance	651-T	230	575/1150
3	50	Whse.	SK-131.5	230	600/2200
1	40	G.E.	CD-123	230	500/1000
1	40	Whse.	SK-140	230	500/1700
1	32½	Whse.	SK-150	230	400/1200
2	25	Whse.	SK-93	230	1800
1	20	Cr. Wh.	D.P.B.B.	230	1150/2400
1	20	Whse.	SK-123	230	400/1200
1	15	G.E.	CD-85	230	575/2300
3	15	Whse.	SK-100L	230	500/1500
1	15	Reliance	155-T	230	400/1600
1	10	Whse.	SK-103	230	400/1600
1	10	Al. Ch.	E-122	230	300/1200
4	10	Whse.	SK-91	230	250/1000
1	7½	G.E.	CD-75	230	695/2070
1	7½	G.E.	CD-85	230	337/1350
4	5/7½	Reliance	T.E.F.C.	230	337/1350

MOTOR GENERATOR SETS

Qu.	KW	Make	R.P.M.	D.C. Volts	A.C. Volts
1	2500	Whse.	720	600	4160/2300
2	1250	Whse.	720	600	2300
1	500	Cr. Wh.	720	600	2300/440
2	500	Whse.	1200	125/250	2300/440
1	400	Cr. Wh.	1200	125/250	2300/440
1	300	G.E.	1200	250	2300
3	200	G.E.	900	125/250	2300
1	150	G.E.	1200	250	2300
1	100	Whse.	900	250	2300
1	100	Cr. Wh.	1200	125	440/220
1	75	G.E.	1200	250	440/220
3	50	G.E.	1200	250	440/220

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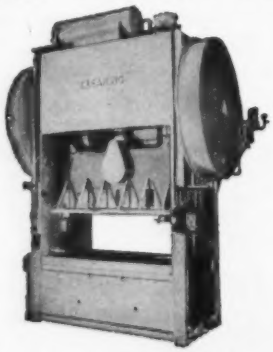

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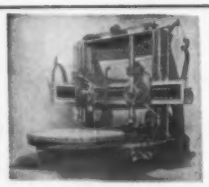

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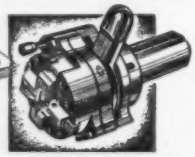
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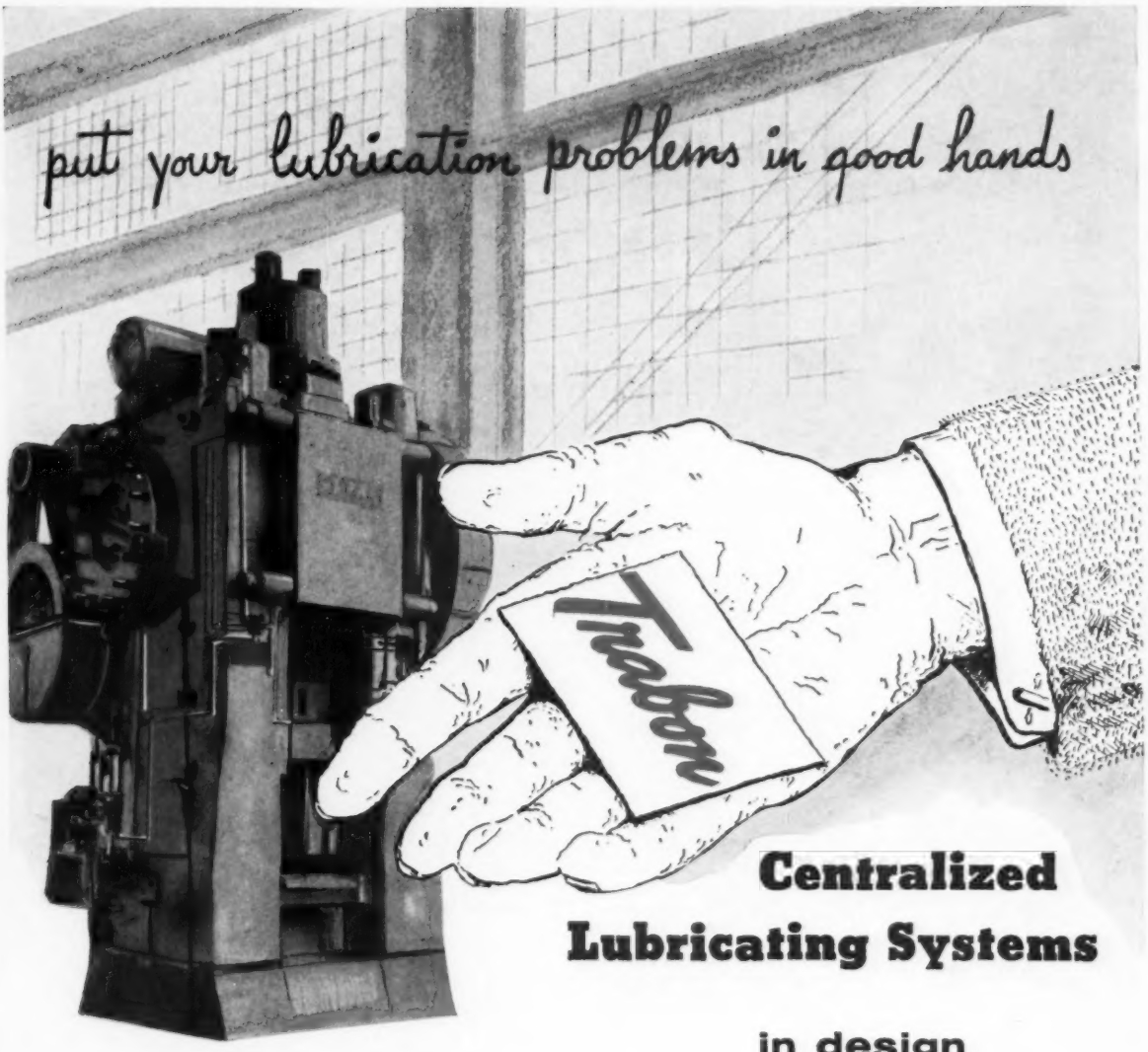

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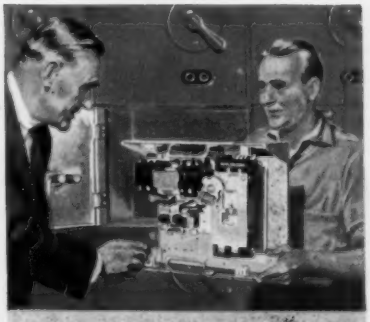

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